NEWMARKET CORP
Form 10-K
February 15, 2017
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K
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 1-32190

NEWMARKET CORPORATION
Incorporated pursuant to the Laws of the Commonwealth of Virginia
Internal Revenue Service Employer Identification No. 20-0812170
330 South Fourth Street
Richmond, Virginia 23219-4350
804-788-5000
Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered
COMMON STOCK, without par value	NEW YORK STOCK EXCHANGE

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 x No o
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 o No x
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 x No o
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes x No o
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of 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 the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.
Large accelerated filer x Accelerated filer o

Non-accelerated filer o Smaller reporting company o
Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes o No x
Aggregate market value of voting stock held by non-affiliates of the registrant as of June 30, 2016 (the last business day of the registrant's most recently completed second fiscal quarter): $3,560,347,159*
Number of shares of Common Stock outstanding as of January 31, 2017: 11,852,697

DOCUMENTS INCORPORATED BY REFERENCE
Portions of NewMarket Corporation's definitive Proxy Statement for its 2017 Annual Meeting of Shareholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A under the Securities Exchange Act of 1934 are incorporated by reference into Part III of this Annual Report on Form 10-K.

* In determining this figure, an aggregate of 3,256,398 shares of Common Stock as beneficially owned by Bruce C. Gottwald and members of his immediate family have been excluded and treated as shares held by affiliates. See Item 12. The aggregate market value has been computed on the basis of the closing price on the New York Stock Exchange on June 30, 2016.

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PART I

ITEM 1. BUSINESS

NewMarket Corporation (NewMarket) (NYSE: NEU) is a holding company and is the parent company of Afton Chemical Corporation (Afton), Ethyl Corporation (Ethyl), NewMarket Services Corporation (NewMarket Services), and NewMarket Development Corporation (NewMarket Development).

Each of our subsidiaries manages its own assets and liabilities. Afton manufactures and sells petroleum additives, while Ethyl represents the sale of tetraethyl lead (TEL) in North America and certain contracted manufacturing and services. NewMarket Development manages the property that we own in Virginia. NewMarket Services provides various administrative services to NewMarket, Afton, Ethyl, and NewMarket Development. NewMarket Services departmental expenses and other expenses are billed to each subsidiary pursuant to services agreements between the companies.

References in this Annual Report on Form 10-K to "we," "us," "our," and "NewMarket" are to NewMarket Corporation and its consolidated subsidiaries, unless the context indicates otherwise.

As a specialty chemicals company, Afton develops and manufactures highly formulated lubricant and fuel additive packages and markets and sells these products worldwide. Afton is one of the largest lubricant and fuel additives companies in the world. Lubricant and fuel additives are necessary products for efficient and reliable operation of vehicles and machinery. From custom-formulated additive packages to market-general additives, we believe Afton provides customers with products and solutions that make engines run smoother, machines last longer, and fuels burn cleaner.

Through an open, flexible, and collaborative style, Afton works closely with its customers to understand their business and help them meet their goals. This style has allowed Afton to develop long-term relationships with its customers in every major region of the world, which Afton serves through eleven manufacturing facilities across the globe.

With more than 550 employees in research and development, Afton is dedicated to developing additive formulations that are tailored to our customers' and the end-users' specific needs. Afton's portfolio of technologically-advanced, value-added products allows it to provide a full range of products, services, and solutions to its customers.

Ethyl provides contracted manufacturing and services to Afton and to third parties, and is a marketer of TEL in North America.

NewMarket Development manages the property that we own in Richmond, Virginia consisting of approximately 57 acres. Our corporate offices are included in this acreage, as well as a research and testing facility, and several acres dedicated to other uses. We are currently exploring various development opportunities for portions of the property as the demand warrants. This effort is ongoing in nature, as we have no specific timeline for any future developments.

We were incorporated in the Commonwealth of Virginia in 2004. Our principal executive offices are located at 330 South Fourth Street, Richmond, Virginia, and our telephone number is (804) 788-5000. We employed 1,998 people at the end of 2016.

Business Segments

Our business is composed of one segment, petroleum additives, which is primarily represented by Afton. The TEL business of Ethyl is reflected in the "All other" category. Each of these is discussed below.

Petroleum Additives—Petroleum additives are used in lubricating oils and fuels to enhance their performance in machinery, vehicles, and other equipment. We manufacture chemical components that are selected to perform one or more specific functions and combine those chemicals with other chemicals or components to form additive packages for use in specified end-user applications. The petroleum additives market is a global marketplace, with customers ranging from large, integrated oil companies to national and independent companies.

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We believe our success in the petroleum additives market is largely due to our ability to deliver value to our customers through our products and our open, flexible, and collaborative working style. We accomplish this by understanding what our customers value and by applying our technical capabilities, formulation expertise, broadly differentiated product solutions, and global supply capabilities to satisfy the customers' needs. We invest significantly in research and development in order to meet our customers' needs and to adapt to the rapidly changing environment for new and improved products and services.

We view the petroleum additives marketplace as being comprised of two broad product applications: lubricant additives and fuel additives. Lubricant additives are highly formulated chemical solutions that, when blended with base fluids, improve the efficiency, durability, performance, and functionality of mineral oils, synthetic oils, and biodegradable fluids, thereby enhancing the performance of machinery and engines. Fuel additives are chemical components that help oil refiners meet fuel specifications or formulated packages that improve the performance of gasoline, diesel, biofuels, and other fuels, resulting in lower operating costs, improved vehicle performance, and reduced tailpipe or smokestack emissions.

Lubricant Additives

Lubricant additives are essential ingredients for making lubricating oils. Lubricant additives are used in a wide variety of vehicle and industrial applications, including engine oils, transmission fluids, off-road powertrain and hydraulic systems, gear oils, hydraulic oils, turbine oils, metalworking fluids and virtually any other application where metal-to-metal moving parts are utilized. Lubricant additives are organic and synthetic chemical components that enhance wear protection, prevent deposits, and protect against the hostile operating environment of an engine, transmission, axle, hydraulic pump, or industrial machine.

Lubricants are widely used in operating machinery from transportation vehicles to heavy industrial equipment. Lubricants provide a layer of protection between moving mechanical parts. Without this layer of protection, the normal functioning of machinery would not occur. Effective lubricants reduce downtime and increase efficiency. Specifically, lubricants serve the following main functions:

- friction reduction—Friction is reduced by maintaining a thin film of lubricant between moving surfaces, preventing them from coming into direct contact with one another and reducing wear on moving machinery, thereby providing longer life and operational efficiency.
- heat removal—Lubricants act as coolants by removing heat resulting either from friction or through contact with other, higher temperature materials.
- containment of contaminants—Lubricants function by carrying contaminants away from the machinery and neutralizing the harmful impact of the by-products created by combustion.

The functionality of lubricants is created through an exact balance between a base fluid and performance enhancing additives. This balance is the goal of effective formulations achieved by experienced research and development professionals. We offer a full line of lubricant additive packages, each of which is composed of component chemicals specially selected to perform desired functions. We manufacture most of the chemical components and blend these components to create formulated additives packages designed to meet industry and customer specifications. Lubricant additive components are generally classified based upon their intended functionality, including:

- detergents, which clean moving parts of engines and machines, suspend oil contaminants and combustion by-products, and absorb acidic combustion products;
- dispersants, which serve to inhibit the formation of sludge and particulates;
- extreme pressure/antiwear agents, which reduce wear on moving engine and machinery parts;
- viscosity index modifiers, which improve the viscosity and temperature characteristics of lubricants and help the lubricant flow evenly to all parts of an engine or machine; and
- antioxidants, which prevent oil from degrading over time.

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We are one of the leading global suppliers of specially formulated lubricant additives that combine some or all of the components described above to develop our products. Our products are highly formulated, complex chemical compositions derived from extensive research and testing to ensure all additive components work together to provide the intended results. Our products are engineered to meet specifications prescribed by either the industry or a specific customer. Purchasers of lubricant additives tend to be integrated oil companies or independent compounders/blenders. We make no sales directly to end-users or to original equipment manufacturers (OEMs).

We view our participation in the lubricant marketplace in three primary areas: engine oil additives, driveline additives, and industrial additives. Our view is not necessarily the same way others view the market.

Engine Oil Additives—The largest submarket within the lubricant additives marketplace is engine oil additives which consists of additives designed for passenger cars, motorcycles, on and off-road heavy duty commercial equipment, locomotives, and large engines in ocean-going vessels. We estimate engine oil additives represent approximately 70% of the overall lubricant additives market volume.

The engine oil market’s primary customers include consumers, fleet owners, mining and construction companies, farmers, railroads, shipping companies, service dealers, and OEMs. The primary functions of engine oil additives are to reduce friction, prevent wear, control formation of sludge and oxidation, and prevent rust. Engine oil additives are typically sold to lubricant manufacturers who combine them with a base oil fluid to meet internal, industry, and OEM specifications.

Key drivers of engine oil additives demand are the total vehicle miles driven, fuel economy, number of vehicles on the road, the average age of vehicles on the road, drain intervals, engine and crankcase size, changes in engine design, and temperature and specification changes driven by the OEMs. The extension of drain intervals has generally offset increased demand due to higher vehicle population, new hardware, and more miles driven. Other key drivers include industrial production rates, agricultural output, mining and construction output, environmental regulations, and infrastructure investments of commercial companies. Afton offers products that enhance the performance of mineral, part-synthetic, and fully-synthetic engine oils.

Driveline Additives—The driveline additives submarket is comprised of additives designed for products such as transmission fluids, axle fluids, and off-road powertrain fluids. This submarket shares in the 30% of the market not covered by engine oil additives. Transmission fluids primarily serve as the power transmission and heat transfer medium in the area of the transmission where the torque of the drive shaft is transferred to the gears of the vehicle. Axle fluids lubricate gears and bearings in axles, and powertrain fluids are used in off-highway powertrain and hydraulic systems. Other products in this area include power steering fluids, shock absorber fluids, gear oils, and lubricants for heavy machinery. These products must conform to highly prescribed specifications developed by vehicle OEMs for specific models or designs. These additives are generally sold to oil companies for ultimate sale to vehicle OEMs for new vehicles (factory-fill), service dealers for aftermarket servicing (service-fill), retailers, and distributors.

Key drivers of the driveline additives marketplace are the number of vehicles manufactured, total number of vehicles in operation, drain intervals for transmission fluids and axle fluids, changes in engine and transmission design and temperatures, and specification changes driven by the OEMs.

Industrial Additives—The industrial additives submarket is comprised of additives designed for products for industrial applications such as hydraulic fluids, grease, industrial gear fluids, industrial specialty applications, such as turbine oils, and metalworking fluids. This submarket also shares in the 30% of the market not covered by engine oil additives. These products must conform to industry specifications, OEM requirements, and/or application and operating environment demands. Industrial additives are generally sold to oil companies, service dealers for after-market servicing, and distributors.

Key drivers of the industrial additives marketplace are gross domestic product levels and industrial production.

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Fuel Additives

Fuel additives are chemical compounds that are used to improve both the oil refining process and the performance of gasoline, diesel, biofuels, and other fuels. Benefits of fuel additives in the oil refining process include reduced use of crude oil, lower processing costs, and improved fuel storage properties. Fuel performance additives enhance fuel economy, improve ignition and combustion efficiency, reduce emission particulates, maintain engine cleanliness, and protect against deposits in fuel injectors, intake valves, and the combustion chamber. Our fuel additives are extensively tested and designed to meet stringent industry, government, OEM, and individual customer requirements.

Many different types of additives are used in fuels. Their use is generally determined by customer, industry, OEM, and government specifications, and often differs from country to country. The types of fuel additives we offer include:

- gasoline performance additives, which clean and maintain key elements of the fuel delivery systems, including fuel injectors and intake valves, in gasoline engines;
- diesel fuel performance additives, which perform similar cleaning functions in diesel engines;
- cetane improvers, which increase the cetane number (ignition quality) in diesel fuel by reducing the delay between injection and ignition;
- stabilizers, which reduce or eliminate oxidation in fuel;
- corrosion inhibitors, which minimize the corrosive effects of combustion by-products and prevent rust;
- lubricity additives, which restore lubricating properties lost in the refining process;
- cold flow improvers, which improve the pumping and flow of distillate and diesel fuels in cold temperatures; and
- octane enhancers, which increase octane ratings and decrease emissions.

We offer a broad line of fuel additives worldwide and sell our products to major fuel marketers and refiners, as well as independent terminals and other fuel blenders.

Key drivers in the fuel additive marketplace include total vehicle miles driven, fuel economy, the introduction of new engine designs, regulations on emissions (both gasoline and diesel), quality of the crude oil slate and performance standards, and marketing programs of major oil companies.

Competition

We believe we are one of the four largest manufacturers and suppliers in the petroleum additives marketplace.

In the lubricant additives submarket of petroleum additives, our major competitors are The Lubrizol Corporation (a wholly-owned subsidiary of Berkshire Hathaway Inc.), Infineum (a joint venture between ExxonMobil Chemical and Royal Dutch Shell plc), and Chevron Oronite Company LLC. There are several other suppliers in the worldwide market who are competitors in their particular product areas.

The fuel additives submarket is characterized by more competitors. While we participate in many facets of the fuel additives market, our competitors tend to be more narrowly focused. In the gasoline detergent market, we compete mainly against BASF, Chevron Oronite Company LLC, and The Lubrizol Corporation. In the diesel and refinery markets, we compete mainly against The Lubrizol Corporation, Infineum, BASF, Clariant Ltd., and Innospec Inc. We also compete against other regional competitors in the fuel additives marketplace.

The competition among the participants in these industries is characterized by the need to provide customers with cost effective, technologically-capable products that meet or exceed industry specifications. The need to continually increase technology performance and lower cost through formulation technology and cost improvement programs is vital for success in this environment.

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All Other—The “All other” category includes the operations of the TEL business (primarily sales of TEL in North America), as well as certain contracted manufacturing and services performed by Ethyl. The Ethyl facility is located in Houston, Texas and is substantially dedicated to terminal operations related to TEL and other fuel additives. The financial results of the petroleum additives activities by Ethyl are reflected in the petroleum additives segment results. The “All other” category financial results include a service fee charged by Ethyl for its production services to Afton.

Raw Materials and Product Supply

We use a variety of raw materials and chemicals in our manufacturing and blending processes and believe the sources of these are adequate for our current operations. The primary raw materials for Afton are base oil, polyisobutylene, antioxidants, alcohols, solvents, sulfonates, friction modifiers, olefins, and copolymers.

As the performance requirements of our products become more complex, we often work with highly specialized suppliers. In some cases, we source from a single supplier. In cases where we decide to source from a single supplier, we manage our risk by maintaining safety stock of the raw material or qualifying alternate suppliers. The backup position could take additional time to implement, but we are confident we can ensure continued supply for our customers. We continue to monitor the raw material supply situation and continually adjust our procurement strategies as conditions require.

Research, Development, and Testing

Research, development, and testing (R&D) provides Afton with new performance-based solutions for our customers in the petroleum additives market. We develop products through a combination of chemical synthesis, formulation development, engineering design, and performance testing. In addition to developing new products, R&D provides our customers and OEMs with data to substantiate product differentiation and technical support to assure total customer satisfaction.

We are committed to providing the most advanced products, comprehensive testing programs, and superior technical solutions tailored to the needs of our customers and to OEMs worldwide. R&D expenditures, which totaled $157 million in 2016, $158 million in 2015, and $139 million in 2014, are expected to remain essentially flat in 2017. Afton continues to expand our internal testing, research, and customer support capabilities around the world in support of our goals of providing market-driven technical leadership and performance-based differentiation. In 2016, we invested in additional capability at our laboratories in Suzhou, China and Bracknell, United Kingdom.

Afton continues to develop new products and technology to meet the changing requirements of OEMs and to keep our customers well-positioned for the future. A significant portion of our R&D investment is dedicated to the development of products that are differentiated by their ability to deliver improved fuel efficiency in addition to robust performance in a wide range of new vehicle and industrial equipment designs. Afton’s state-of-the art testing capabilities are enabling customized research in all areas of performance needed by both OEMs and tier one suppliers. Our leading-edge capabilities and fundamental understanding in the areas of combustion, friction control, energy efficiency, and wear prevention are used to set the stage for next generation products in all areas.

In 2016, we successfully launched new technologies across all of our lubricant additive and fuel additive product areas. We developed new engine oil products for passenger cars and commercial trucks in support of our customers in all the major regions of the world in which we operate. Research in the engine oil area remained high as we developed and launched products in 2016 to meet new European and North America industry standards and as we prepare for the new engine oil specification in North America for passenger car motor oil, ILSACGF-6. This new specification is expected to go into effect in 2019.

Our industrial additives product line continued to expand with the development of new products in multiple application areas including hydraulic fluids, industrial gear oils, turbine oils, grease additives, and metalworking fluid additives. Research is focused on the development of technologies that will provide differentiation to our customers in multiple performance areas including equipment life and energy efficiency.

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We continue to provide leading technology in the fuel additives area. In 2016, we developed and launched new products in all product lines including gasoline performance additives and diesel performance additives, as well as additives used in the refining and distribution of fuels. Research is focused on the development of new technologies that perform well in new, modern engine designs and changing fuel properties, as well as addressing the growing need for increased fuel economy and emissions reduction. In addition, we continue to maintain close interactions with regulatory, industry, and OEM leaders to guide our development of future fuel additive technologies based on well-defined market needs.

Research continued in our transmission fluid, axle oil, and tractor fluid product lines. This included the development of new OEM-specific additives used in factory fill fluids installed during automotive component and vehicle assembly in the United States, Germany, Japan, India, and China. In addition, we developed new products for the service-fill sector to provide our customers with the latest additive technology available to differentiate their offering to the retail market.

Intellectual Property

Our intellectual property, including our patents, licenses, and trademarks, is an important component of our business. We actively protect our inventions, new technologies, and product developments by filing patent applications and maintaining trade secrets. We currently own approximately 1,200 issued or pending United States and foreign patents. In addition, we have acquired the rights under patents and inventions of others through licenses or otherwise. We take care to respect the intellectual property rights of others and we believe our products do not infringe upon those rights. We vigorously participate in patent opposition proceedings around the world, where necessary, to secure a technology base free of infringement. We believe our patent position is strong, aggressively managed, and sufficient for the conduct of our business.

We also have several hundred trademark registrations throughout the world for our marks, including NewMarket®, Afton Chemical®, Ethyl®, mmt®, HiTEC®, TecGARD®, GREENBURN®, Passion for Solutions®, CleanStart®, Polartech®, BioTEC®, Microbotz®, and Axcel®, as well as a pending trademark application for DriveMore™.

Commitment to Environmental and Safety Excellence

Our commitment to the environment and safety excellence applies to every employee, contractor, and visitor every day, at every site. Safety and environmental responsibility are a way of life at NewMarket - enhancing operations, the way we work, and the relationships we maintain with our employees, customers, supply chain partners, and the communities in which we operate. Our objective is to establish a culture where our employees understand that good environmental and safety performance is good business and understand that environmental compliance and safety is their personal responsibility. Every employee at NewMarket is responsible for ensuring that our high standards in the area of health, safety (including process safety), environmental protection, and security are upheld at all times.

Our Global Responsible Care Policy Statement includes a commitment to conduct operations in a manner that protects our employees, communities, and the environment, to comply with all applicable laws and regulations, and to reduce our environmental impacts. Additionally, in pursuit of our vision of zero incidents, we work with our employees and other key stakeholders to establish appropriate goals, objectives and targets.

Both Afton and Ethyl have implemented Responsible Care Management Systems (RCMS® or RC14001®) at U.S. facilities. Our implementation of RCMS® is certified by an independent third-party auditing process. Additionally, Afton's Feluy, Belgium; Suzhou, China; Hyderabad, India; and Manchester, England plants are certified to the environmental standard ISO 14001. Suzhou is also certified to OHSAS 18001, a global occupational health and safety standard. Afton's Sauget, Illinois plant continues to be an OSHA VPP (Voluntary Protection Program) "Star" worksite.

In 2016, we continued to enhance our "Actively Caring" safety program, where people look out for the safety and welfare of others with courage and compassion, enabling the achievement of an injury-free environment. Our worldwide injury/illness recordable rate (which is the number of injuries per 200,000 hours worked) in 2016 was .52. Our performance is a demonstration of our safety-first culture and represents a focused effort by all of our employees. We are extremely proud of our accomplishments in this area. Both Afton and Ethyl continue to be top performers among their industry peers. While our safety performance is very strong, we strive for continual improvement with a vision of having zero injuries.

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As members of the American Chemistry Council (ACC), Afton and Ethyl provide data on twelve metrics used to track environmental impact, safety, energy use, community outreach and emergency preparedness, greenhouse gas intensity, and product stewardship performance of the ACC member companies. These can be viewed at http://responsiblecare.americanchemistry.com/Performance-Results. The information on this website is not, and shall not be deemed to be, a part of this Annual Report on Form 10-K or incorporated by reference in this Annual Report on Form 10-K or any other filings we make with the Securities and Exchange Commission (SEC).

Environmental

We believe that we comply, in all material respects, with laws, regulations, statutes, and ordinances protecting the environment, including those related to the management and stewardship of chemicals. We have policies and procedures in place establishing regular reviews of our compliance and stewardship, as well as monitoring any significant existing, potential or threatened environmental issues that could materially affect the company.

Our total accruals for environmental remediation, dismantling, and decontamination were approximately $16 million at December 31, 2016 and $17 million December 31, 2015.

As new technology becomes available, it may be possible to reduce accrued amounts. While we believe that we are currently fully accrued for known environmental issues, it is possible that unexpected future costs could have a significant financial impact on our financial position, results of operations, and cash flows.

We spent approximately $24 million in 2016, $22 million in 2015, and $22 million in 2014 for ongoing environmental operating and clean-up costs, excluding depreciation of previously capitalized expenditures. These environmental operating and clean-up expenses are primarily included in cost of goods sold.

For capital expenditures on pollution prevention and safety projects, we spent $14 million in 2016, $13 million in 2015, and $12 million in 2014. We expect expenditures in 2017 to be at a level similar to the previous three years.

The costs of complying with governmental pollution prevention and safety regulations are subject to:

- potential changes in applicable statutes and regulations (or their enforcement and interpretation);
- uncertainty as to the success of anticipated solutions to pollution problems;
- uncertainty as to whether additional expense may prove necessary; and
- potential for emerging technology to affect remediation methods and reduce associated costs.

We are subject to liabilities associated with the investigation and cleanup of hazardous substances, as well as personal injury, property damage, or natural resource damages arising from the release of, or exposure to, such hazardous substances. Further, we may have environmental liabilities imposed in many situations without regard to violations of laws or regulations. These liabilities may also be imposed jointly and severally (so that a responsible party may be held liable for more than its share of the losses involved, or even the entire loss) and may be imposed on many different entities with a relationship to the hazardous substances at issue, including, for example, entities that formerly owned or operated the property and entities that arranged for the disposal of the hazardous substances at an affected property. We are subject to many environmental laws, including the federal Comprehensive Environmental Response, Compensation and Liability Act, commonly known as CERCLA or Superfund, in the United States, and similar foreign and state laws.

Under CERCLA, we are currently considered a potentially responsible party (PRP), at several sites, ranging from a de minimis PRP or a minor PRP, to involvement considered greater than minor PRP involvement. At some of these sites, the remediation methodology, as well as the proportionate shares of each PRP, has been well established. Other sites are not as mature, which makes it more difficult to reasonably estimate our share of the future clean-up or remediation costs.

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In 2000, the Environmental Protection Agency (EPA) named us as a PRP under Superfund law for the clean-up of soil and groundwater contamination at the five grouped disposal sites known as "Sauget Area 2 Sites" in Sauget, Illinois. Without admitting any fact, responsibility, fault, or liability in connection with this site, we are participating with other PRPs in site investigations and feasibility studies. In December 2013, the EPA issued its Record of Decision confirming its remedies for the selected Sauget Area 2 sites. We have accrued our estimated proportional share of the remedial costs and expenses addressed in the Record of Decision. We do not believe there is any additional information available as a basis for revision of the liability that we have established at December 31, 2016. The amount accrued for this site is not material. We also have several other sites where we are in the process of environmental remediation and monitoring. See Note 16 for further information.

Geographic Areas

We have operations in the United States, Europe, Asia Pacific, India, Latin America, Canada, and the Middle East. The economies are generally stable in the countries where we do most of our business, although many of those countries have experienced economic downturns in the past. In countries with more political or economic uncertainty, we generally minimize our risk of loss by utilizing U.S. Dollar-denominated transactions, letters of credit, and prepaid transactions. Our foreign customers consist of global, national, and independent oil companies, as well as financially viable state-owned organizations.

The tables below report net sales and long-lived assets by geographic area, as well as by country for those countries with significant net sales or long-lived assets. Since our foreign operations are significant to our overall business, we are also presenting net sales in the table below by the major regions in which we operate. NewMarket assigns net sales to geographic areas based on the location to which the product was shipped to a third party. Long-lived assets in the table below include property, plant, and equipment, net of depreciation. The change in net sales during the three-year period is discussed more fully in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

Net sales to one customer of our petroleum additives segment exceeded 10% of consolidated net sales in 2014. Sales to Royal Dutch Shell plc and its affiliates (Shell) amounted to $261 million (11% of consolidated net sales) in 2014. These sales represented a wide range of products sold to multiple Shell affiliates around the world. No customer exceeded 10% of net sales in 2016 or 2015.

Geographic Areas

	Years Ended December 31,		
(in millions)	2016	2015	2014
Net sales			
United States	$701	$776	$811
Europe, Middle East, Africa, India	653	669	784
Asia Pacific	471	436	471
Other foreign	224	260	269
Net sales	$2,049	$2,141	$2,335

	December 31,	
(in millions)	2016	2015
Long-lived assets		
United States	$225	$198
Singapore	190	113
Other foreign	89	91
Total long-lived assets	$504	$402

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Availability of Reports Filed with the Securities and Exchange Commission and Corporate Governance Documents
Our internet website address is www.newmarket.com. We make available, free of charge through our website, our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (Exchange Act), as soon as reasonably practicable after such documents are electronically filed with, or furnished to, the SEC. In addition, our Corporate Governance Guidelines, Code of Conduct, and the charters of our Audit, Compensation, and Nominating and Corporate Governance Committees are available on our website and are available in print, without charge, to any shareholder upon request by contacting our Corporate Secretary at NewMarket Corporation, 330 South Fourth Street, Richmond, Virginia 23219. The information on our website is not, and shall not be deemed to be, a part of this Annual Report on Form 10-K or incorporated by reference in this Annual Report on Form 10-K or any other filings we make with the SEC.

Executive Officers of the Registrant
The names and ages of all executive officers as of February 15, 2017 follow.

Name	Age	Positions
Thomas E. Gottwald	56	Chairman of the Board, President, and Chief Executive Officer (Principal Executive Officer)
Brian D. Paliotti	40	Chief Financial Officer and Vice President (Principal Financial Officer)
Bruce R. Hazelgrove, III	56	Executive Vice President and Chief Administrative Officer
William J. Skrobacz	57	Controller (Principal Accounting Officer)
Cameron D. Warner, Jr.	58	Treasurer
M. Rudolph West	63	Vice President, General Counsel, and Secretary
Robert A. Shama	56	President, Afton Chemical Corporation

Our officers, at the discretion of the Board of Directors, hold office until the meeting of the Board of Directors following the next annual shareholders' meeting. Mr. Gottwald, Mr. Hazelgrove, and Mr. Warner have served in their capacity for at least the last five years. Mr. Paliotti, Mr. West, Mr. Skrobacz, and Mr. Shama have served in their capacities for less than five years.

Mr. Paliotti has been employed by NewMarket or Afton since 2008. Prior to being named Chief Financial Officer and Vice President effective January 1, 2015, Mr. Paliotti was Vice President, Finance, of NewMarket Services since 2013, Senior Financial Officer of NewMarket Services since 2011, and Financial Officer of Afton since 2008. Mr. West was named Vice President, General Counsel, and Secretary effective January 1, 2016. Prior to that date, Mr. West served as Assistant General Counsel and Secretary for more than five years. Mr. Skrobacz joined NewMarket in May 2011 as Senior Manager, Business Assurance, and was appointed Controller Designate in September 2012. In May 2013, he was appointed Controller. Prior to joining NewMarket, Mr. Skrobacz served as Controller of UPS Freight, a wholly-owned subsidiary of United Parcel Service, Inc., since 2008. Mr. Shama has been employed by Afton for at least five years in various senior management capacities. Prior to being named President of Afton in 2013, he was Executive Vice President of Afton beginning in 2012 and Senior Vice President North America and Chief Marketing Officer in 2011. From 2008 to 2010, Mr. Shama was Vice President Sales and Marketing North America.

ITEM 1A. RISK FACTORS

Our business is subject to many factors that could have a material adverse effect on our future performance, results of operations, financial condition, or cash flows and could cause our actual results to differ materially from those expressed or implied by forward-looking statements made in this Annual Report on Form 10-K. Those risk factors are outlined below.

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- Lack of availability of raw materials, including sourcing from some single suppliers, could negatively impact our ability to meet customer demand.

The chemical industry can experience limited supply of certain materials. In addition, in some cases, we choose to source from a single supplier. Any significant disruption in supply, for any reason, could adversely affect our ability to obtain raw materials, which in turn could adversely affect our ability to ensure continued supply for our customers and to meet customer demand.

- A disruption in the availability or capacity of distribution systems could negatively impact our ability to meet our customers' needs and affect our competitive position.

We rely on a variety of modes of transportation to deliver products to our customers, including rail cars, cargo ships, and trucks. We depend upon the availability of a distribution infrastructure to deliver our products in a safe and timely manner. Any disruptions in this infrastructure network, whether caused by human error, accidents, deliberate acts of violence, limitations on capacity, repairs and improvements to infrastructure components, earthquakes, storms, or other natural disasters, could adversely affect our ability to meet customer demand.

- A significant disruption or disaster at one of our production facilities, including those facilities which are sole producers of certain of our products, could result in our inability to meet production requirements and projected customer demand. This could potentially result in us incurring significant liabilities.

We are dependent upon the continued safe operation of our production facilities. Several of the products we sell are produced only in one location. A prolonged disruption or disaster at one of our facilities could result in our inability to meet production requirements.

Our production facilities are subject to various hazards associated with the manufacturing, handling, storage, and transportation of chemical materials and products, some that are reactive, explosive, and flammable. Such hazards could include leaks, ruptures, chemical spills, explosions, or fires which result in the discharge or release of toxic or hazardous substances or gases; mechanical failures; unscheduled downtime; and environmental hazards. These sites may also experience significant disruptions in operations due to inclement weather, natural disasters, flooding, and levee breaches. Many of these hazards could cause a disruption in the production of our products and may diminish our ability to meet output goals. We cannot assure that our facilities will not experience these types of hazards and disruptions in the future or that these incidents will not result in production delays and affect our ability to meet production requirements. Any such disruptions or disasters at our facilities could result in us losing revenue or not being able to maintain our relationships with our customers.

Additionally, some of the hazards mentioned above could result in significant liabilities related to personal injury and loss of life; severe damage to, or destruction of, property and equipment; and environmental contamination.

- Our research and development efforts are costly and may not succeed, which could impair our ability to meet our customers' needs, affect our competitive position, and result in a loss of market share.

The petroleum additives industry is subject to periodic technological change, changes in performance standards, and ongoing product improvements. Further, technological changes in some or all of our customers' products or processes may make our products obsolete. As a result, the life cycle of our products is often hard to predict. In order to maintain our profits and remain competitive, we must effectively respond to technological changes in our industry and successfully develop, manufacture, and market new or improved products in a cost-effective and timely manner. As a result, we must commit substantial resources each year to research and development to maintain and enhance our technological capabilities and meet our customers' changing needs. Ongoing investments in research and development for future products could result in higher costs without a proportional increase in profits. Additionally, for any new product program, there is a risk of technical or market failure in which case we may not be able to develop the new commercial products needed to maintain and enhance our competitive position, or we may need to commit additional resources to new product development programs. Moreover, new products may have lower margins than the products they replace.

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- Our failure to protect our intellectual property rights could harm our competitive position and could adversely affect our future performance and growth.

Protection of our proprietary processes, methods, compounds, and other technologies is important to our business. We depend upon our ability to develop and protect our intellectual property rights to distinguish our products from those of our competitors. Failure to protect our existing intellectual property rights may result in the loss of valuable technologies or having to pay other companies for infringing on their intellectual property rights. The inability to continue using certain of our trademarks or service marks could result in the loss of brand recognition, and could require us to devote additional resources to advertise, rebrand our products, and market our brands. See Item 1, "Business-Intellectual Property."

We rely on a combination of patent, trade secret, trademark, and copyright law, as well as judicial enforcement, to protect our intellectual property and technologies. We cannot assure that the measures taken by us to protect these assets and rights will provide meaningful protection or that adequate remedies will be available in the event of an unauthorized use or disclosure of our trade secrets or manufacturing expertise. We cannot assure that any of our intellectual property rights will not be challenged, invalidated, circumvented, or rendered unenforceable.

Furthermore, we cannot assure that any pending patent application filed by us will result in an issued patent, or if patents are issued to us, that those patents will provide meaningful protection against competitors or against competitive technologies. We could face patent infringement claims from our competitors or others alleging that our processes or products infringe on their proprietary technologies. If we were found to be infringing on the proprietary technology of others, we may be liable for damages, and we may be required to change our processes, to redesign our products partially or completely, to pay to use the technology of others, or to stop using certain technologies or producing the infringing product entirely. Even if we ultimately prevail in an infringement suit, the existence of the suit could prompt customers to switch to products that are not the subject of infringement suits. We may not prevail in any intellectual property litigation and such litigation may result in significant legal costs or otherwise impede our ability to produce and distribute key products.

We also rely on unpatented proprietary manufacturing expertise, continuing technological innovation and other trade secrets to develop and maintain our competitive position. While we generally enter into confidentiality agreements with our employees and third parties to protect our intellectual property, we cannot assure that our confidentiality agreements will not be breached, that they will provide meaningful protection for our trade secrets and proprietary manufacturing expertise, or that adequate remedies will be available in the event of an unauthorized use or disclosure of our trade secrets or manufacturing expertise.

In addition, our trade secrets and know-how may be improperly obtained by other means, such as a breach of our information technology security systems or direct theft. Any unauthorized disclosure of our material know-how or trade secrets could adversely affect our business and results of operations.

- In order to be successful, we must attract and retain a highly qualified workforce, including key employees in leadership positions.

The success of our business is highly dependent on our ability to attract and retain highly qualified technical personnel to support our research and development efforts and our agility in effectively responding to technological changes in our industry. To the extent that the demand for skilled personnel exceeds supply, we could experience higher labor, recruiting, or training costs in order to attract and retain such a work force. We compete with other companies, both within and outside of our industry, for qualified technical and scientific personnel such as chemical and industrial engineers. To the extent that we lose experienced personnel through wage competition, normal attrition (including retirement), or other means, we must be able to attract qualified candidates to fill those positions and successfully manage the transfer of critical knowledge from those individuals leaving our company. Our inability to maintain a highly qualified technical workforce could adversely affect our competitive position and result in a loss of market share.

We also must manage leadership development and succession planning throughout our business. To the extent that we are unable to attract, develop, and retain leadership talent successfully, we could experience business disruptions and adversely affect our ability to grow our business.

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- Competitive pressures could adversely affect our margins and profitability.

We face significant competition in all of the product lines and markets in which we compete. We expect that our competitors will develop and introduce new and enhanced products, which could cause a decline in the market acceptance of certain products we manufacture. In addition, as a result of price competition, we may be compelled to reduce the prices for some of our products, which could adversely affect our margins and profitability. Some of our competitors may also have greater financial, technological, and other resources than we have and may be able to maintain greater operating and financial flexibility than we are able to maintain. As a result, these competitors may be able to better withstand changes in conditions within our industry, changes in the prices for raw materials, and changes in general economic conditions.

- Sudden or sharp changes in the prices of and/or demand for raw materials may adversely affect our profit margins.

We utilize a variety of raw materials in the manufacture of our products, including base oil, polyisobutylene, antioxidants, alcohols, solvents, sulfonates, friction modifiers, olefins, and copolymers. We may also enter into contracts which commit us to purchase some of our more critical raw materials based on anticipated demand. Our profitability is sensitive to changes in the quantities of raw materials we may need and the costs of those materials which may be caused by changes in supply, demand or other market conditions, over which we have little or no control. Political and economic conditions globally have caused, and may continue to cause, our demand for and the cost of our raw materials to fluctuate. War, armed hostilities, terrorist acts, civil unrest, or other incidents may also cause a sudden or sharp change in our demand for and the cost of our raw materials. We cannot assure that we will be able to pass on to our customers any future increases in raw material costs in the form of price increases for our products. If our demand for raw materials were to decline such that we would not have need for the quantities required to be purchased under commitment agreements, we could incur additional charges that would affect our profitability.

- We rely on a small number of significant customers concentrated in the lubricant and fuel industries. The loss of sales to any of these customers could significantly reduce our revenues and negatively affect our profitability.

Our principal customers are multinational oil companies primarily in the lubricant and fuel industries. These industries are characterized by the concentration of a few large participants. This concentration of customers affects our overall risk profile, since our customers will be similarly affected by changes in economic, geopolitical, and industry conditions. Many factors affect the level of our customers' spending on our products, including, among others, general business conditions, changes in technology, interest rates, gasoline prices, and consumer confidence in future economic conditions. A sudden or protracted downturn in these industries could adversely affect the buying power of, and purchases by, our customers. The loss of a significant customer or a material reduction in purchases by a significant customer could reduce our revenues and negatively affect our profitability.

- The occurrence or threat of extraordinary events, including domestic and international terrorist attacks, may disrupt our operations, decrease demand for our products, and increase our expenses.

Chemical-related assets may be at greater risk of future terrorist attacks than other possible targets in the United States and throughout the world. Federal legislation has imposed significant site security requirements, specifically on chemical manufacturing facilities. Federal regulations have also been enacted to increase the security of the transportation of hazardous chemicals in the United States. The enactment of further federal regulations to increase the security of the transportation of hazardous chemicals in the United States could result in additional costs.

The occurrence of extraordinary events, including future terrorist attacks and the outbreak or escalation of hostilities, cannot be predicted, but their occurrence can be expected to negatively affect the economy in general, and specifically the markets for our products. The damage from a direct attack on our assets or assets used by us could include loss of life, property damage, and production downtime. In addition, available insurance coverage may not be sufficient to cover all of the damage incurred or, if available, may be prohibitively expensive.

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- We face risks related to our foreign operations that may negatively affect our business.

In 2016, sales to customers outside of the United States accounted for over 65% of consolidated net sales. We do business in all major regions of the world, some of which do not have stable economies or governments. In particular, we sell and market products in countries experiencing political and/or economic instability in the Middle East, Asia Pacific, Latin America, and Europe. Our international operations are subject to international business risks, including unsettled political conditions, expropriation, import and export restrictions, trade policies, increases in royalties, exchange controls, national and regional labor strikes, taxes, government royalties, inflationary or unstable economies, currency exchange rate fluctuations, and changes in laws and policies governing operations of foreign-based companies (such as restrictions on repatriation of earnings or proceeds from liquidated assets of foreign subsidiaries). The occurrence of any one or a combination of these factors may increase our costs or have other adverse effects on our business.

In addition, the United Kingdom's June 2016 vote to withdraw from the European Union has resulted in uncertainties in connection with the United Kingdom's relationship with the European Union and how it will withdraw from the European Union. Further, there are uncertainties as to what impact the United Kingdom's withdrawal from the European Union will have on our operations in both the United Kingdom and Europe and the resulting impact on our profitability.

- A substantial amount of indebtedness could adversely impact our business and limit our operational and financial flexibility.

We have incurred, and may in the future incur, significant amounts of indebtedness to support our operations. Our indebtedness could, among other things, require us to dedicate a substantial portion of our cash flow to repaying our indebtedness, thus reducing the amount of funds available for other general corporate purposes; limit our ability to borrow additional funds necessary for working capital, capital expenditures or other general corporate purposes; and limit our flexibility in planning for, or reacting to, changes in our business.

Our ability to make payments on or refinance our indebtedness will depend on our ability to generate cash from operations in the future. This, to a certain extent, is subject to general economic, financial, competitive, legislative, regulatory, and other factors that are beyond our control.

We cannot guarantee that our business will generate sufficient cash flow from operations or that future borrowings will be available to us under our credit facilities in an amount sufficient to enable us to repay our debt, service our indebtedness, or to fund other liquidity needs. Furthermore, substantially all of our business is conducted through our subsidiaries, and we cannot guarantee that our subsidiaries will be able to distribute funds to us for these purposes.

We may need to refinance all or a portion of our indebtedness on or before maturity. We cannot guarantee that we will be able to refinance any of our indebtedness on commercially reasonable terms or at all.

Additionally, our debt instruments contain restrictive covenants. These covenants may constrain our activities and limit our operational and financial flexibility. The failure to comply with these covenants could result in an event of default.

- We are exposed to fluctuations in foreign exchange rates, which may adversely affect our results of operations.

We conduct our business in the local currency of many of the countries in which we operate. The financial condition and results of operations of our foreign operating subsidiaries are reported in the relevant local currency and then translated to U.S. Dollars at the applicable currency exchange rate for inclusion in our consolidated financial statements. Changes in exchange rates between these foreign currencies and the U.S. Dollar will affect the recorded amounts of our assets and liabilities, as well as our revenues, costs, and operating margins. The primary foreign currencies in which we have exchange rate fluctuation exposure are the European Union Euro, British Pound Sterling, Japanese Yen, Chinese Renminbi, Indian Rupee, Singapore Dollar, Mexican Peso, Australian Dollar, and Canadian Dollar. Exchange rates between these currencies and the U.S. Dollar have fluctuated significantly in recent years and may do so in the future.

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- An information technology system failure may adversely affect our business.

We rely on information technology systems to transact our business. An information technology system failure due to computer viruses, internal or external security breaches, cybersecurity attacks, power interruptions, hardware failures, fire, natural disasters, human error, or other causes could disrupt our operations and prevent us from being able to process transactions with our customers, operate our manufacturing facilities, and properly report transactions in a timely manner. A significant, protracted information technology system failure may adversely affect our results of operations, financial condition, or cash flows.

- Our business could be adversely affected by current and future governmental regulation.

We are subject to regulation by local, state, federal, and foreign governmental authorities. In some circumstances, before we may sell certain products, these authorities must approve these products, our manufacturing processes, and our facilities. We are also subject to ongoing reviews of our products, manufacturing processes, and facilities by governmental authorities. Any delay in obtaining, or any failure to obtain or maintain, these approvals would adversely affect our ability to introduce new products and to generate sales from those products.

New laws and regulations, including climate change regulations, may be introduced in the future that could result in additional compliance costs, seizures, confiscation, recall, or monetary fines, any of which could prevent or inhibit the development, distribution, and sale of our products. If we fail to comply with applicable laws and regulations, we may be subject to civil remedies, including fines, injunctions, and recalls or seizures.

We are subject to the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act, and similar anti-bribery laws in other jurisdictions which generally prohibit companies and their intermediaries from making improper payments to foreign officials for the purposes of obtaining or retaining business. We are also subject to export and import laws and regulations which restrict trading with embargoed or sanctioned countries and certain individuals. Although we have policies and procedures designed to facilitate compliance with these laws and regulations, our employees, contractors and agents may take actions in violation of our policies. Any such violation, even if prohibited by our policies, could adversely affect our business and/or our reputation.

- Legal proceedings and other claims could impose substantial costs on us.

We are involved in numerous administrative and legal proceedings that result from, and are incidental to, the conduct of our business. From time to time, these proceedings involve environmental, product liability, TEL, premises asbestos liability, and other matters. See Item 3, "Legal Proceedings." There is no assurance that our available insurance will cover these claims, that our insurers will not challenge coverage for certain claims, or that final damage awards will not exceed our available insurance coverage.

At any given time, we are involved in claims, litigation, administrative proceedings, and investigations of various types in a number of jurisdictions involving potential environmental liabilities, including clean-up costs associated with waste disposal sites, natural resource damages, property damage, and personal injury. We cannot assure that the resolution of these environmental matters will not have an adverse effect on our results of operations, financial condition, or cash flows.

- Environmental matters could have a substantial negative impact on our business.

As a manufacturer and distributor of chemical products, we are generally subject to extensive local, state, federal, and foreign environmental, safety, and health laws and regulations concerning, among other things, emissions to the air; discharges to land and water; the generation, handling, treatment, and disposal of hazardous waste and other materials; and remediation of contaminated soil, as well as surface and ground water. Our operations entail the risk of violations of those laws and regulations, many of which provide for substantial fines and criminal sanctions for violations. We believe that we comply in all material respects with laws, regulations, statutes, and ordinances protecting the environment, including those related to the discharge of materials. However, we cannot assure that we have been or will be at all times in compliance with all of these requirements.

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In addition, these requirements, and the enforcement or interpretation of these requirements, may become more stringent in the future. Although we cannot predict the ultimate cost of compliance with any such requirements, the costs could be material. Noncompliance could subject us to material liabilities, such as government fines, damages arising from third-party lawsuits, or the suspension and potential cessation of noncompliant operations. We may also be required to make significant site or operational modifications at substantial cost. Future developments could also restrict or eliminate the use of or require us to make modifications to our products.

There may be environmental problems associated with our properties of which we are unaware. The discovery of environmental liabilities attached to our properties could have an adverse effect on our business even if we did not create or cause the problem.

We may also face liability arising from current or future claims alleging personal injury, product liability, or property damage due to exposure to chemicals or other hazardous substances, such as premises asbestos, at or from our facilities. We may also face liability for personal injury, product liability, property damage, natural resource damage, or clean-up costs for the alleged migration of contaminants or hazardous substances from our facilities or for future accidents or spills.

In some cases, we have been identified, and in the future may be identified, as a PRP in connection with state and federal laws regarding environmental clean-up projects. As a PRP, we may be liable for a share of the costs associated with cleaning up hazardous waste sites, such as a landfill to which we may have sent waste.

The ultimate costs and timing of environmental liabilities are difficult to predict. Liability under environmental laws relating to contaminated sites can be imposed retroactively and on a joint and several basis. A liable party could be held responsible for all costs at a site, whether currently or formerly owned or operated, regardless of fault, knowledge, timing of the contamination, cause of the contamination, percentage of contribution to the contamination, or the legality of the original disposal. We could incur significant costs, including clean-up costs, natural resource damages, civil or criminal fines and sanctions, and third-party claims, as a result of past or future violations of, or liabilities under, environmental laws.

- The insurance we maintain may not fully cover all potential exposures.

We maintain property, business interruption, and casualty insurance, but such insurance may not cover all risks associated with the hazards of our business and is subject to limitations, including deductibles and maximum liabilities covered. We may incur losses beyond the limits, or outside the coverage, of our insurance policies, including liabilities for environmental remediation. In the future, we may not be able to obtain coverage at current levels, and our premiums may increase significantly on coverage that we maintain.

- We may be unable to consummate a proposed acquisition transaction due to a lack of regulatory approval or the failure of one or more parties to satisfy conditions to close. In addition, we may not be able to realize the expected benefits from future acquisitions or from investments in our infrastructure, or it may take longer to realize those benefits than originally planned. The inability to achieve our objectives related to these activities could result in unanticipated expenses and losses.

As part of our business growth strategy, we intend to continue pursuing acquisitions and investing in our infrastructure. Our ability to implement these components of our growth strategy will be limited by our ability to identify appropriate acquisition or joint venture candidates; our ability to consummate proposed transactions due to a lack of regulatory approval or the failure of one of the parties to a transaction to satisfy conditions required for closing; and the availability of financial resources, including cash and borrowing capacity. When we acquire new businesses or invest in infrastructure improvements (for example, building new plant facilities), we consider the benefits we expect to realize and time frames over which we will realize those benefits. The expenses incurred in completing these types of activities, the time it takes to integrate the activities into our ongoing business, or our failure to realize the expected benefits from the activities in the planned time frames could result in unanticipated expenses and losses. The process of integrating acquired operations into our existing operations may result in unforeseen operating difficulties and may require significant financial resources that would otherwise be available for the ongoing development or expansion of existing operations.

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- We could be required to make additional contributions to our pension plans, which may be underfunded due to any underperformance of the equities markets.

Our pension plan asset allocation is predominantly weighted towards equities. Cash contribution requirements to our pension plans are sensitive to changes in our plans' actual return on assets. Reductions in our plans' return on assets due to poor performance of the equities markets could cause our pension plans to be underfunded and require us to make additional cash contributions.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our principal operating properties are shown below. Unless indicated, we own the research, development, and testing facilities, as well as the manufacturing and distribution properties, which primarily support the petroleum additives business segment.

Research, Development, and Testing	Richmond, Virginia Bracknell, England Manchester, England Tsukuba, Japan Ashland, Virginia Suzhou, China
Manufacturing and Distribution	Bedford Park, Illinois (lubricant additives) Feluy, Belgium (lubricant additives) Houston, Texas (lubricant and fuel additives; also TEL storage and distribution) Hyderabad, India (lubricant additives) Jurong Island, Singapore (lubricant additives; leased land) Manchester, England (lubricant additives) Orangeburg, South Carolina (fuel additives; manufacturing equipment only) Port Arthur, Texas (lubricant additives) Rio de Janeiro, Brazil (petroleum additives storage and distribution; leased) Sauget, Illinois (lubricant and fuel additives) Suzhou, China (lubricant additives)

We own our corporate headquarters located in Richmond, Virginia, and generally lease our regional and sales offices located in a number of areas worldwide.

NewMarket Development manages the property we own in Richmond, Virginia consisting of approximately 57 acres. Our corporate offices are included in this acreage, as well as a research and testing facility and several acres dedicated to other uses. We are currently exploring various development opportunities for portions of the property as the demand warrants. This effort is ongoing in nature, and we have no specific timeline for any future developments.

Production Capacity

We believe our plants and supply agreements are sufficient to meet expected sales levels. Operating rates of the plants vary with product mix and normal sales swings. We believe that our facilities are well maintained and in good operating condition.

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ITEM 3. LEGAL PROCEEDINGS

We are involved in legal proceedings that are incidental to our business and may include administrative or judicial actions. Some of these legal proceedings involve governmental authorities and relate to environmental matters. For further information, see “Environmental” in Part I, Item 1.

While it is not possible to predict or determine with certainty the outcome of any legal proceeding, we believe the outcome of any of these proceedings, or all of them combined, will not result in a material adverse effect on our consolidated results of operations, financial condition, or cash flows.

In late 2013, Afton initiated a voluntary self-audit of its compliance with certain sections of the Toxic Substances Control Act (TSCA) under the EPA’s audit policy (Audit Policy). If any potential TSCA violations are discovered during the audit, we would voluntarily disclose them to the EPA under the Audit Policy. In August 2014, the EPA staff began its own TSCA inspection of both Afton and Ethyl. While it is not possible to predict or determine with certainty the outcome, we do not believe that any findings identified as a result of our audit or the EPA’s TSCA inspection will have a material adverse effect on our consolidated results of operations, financial condition, or cash flows.

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

Our common stock, with no par value, has traded on the New York Stock Exchange (NYSE) under the symbol "NEU" since June 21, 2004 when we became the parent holding company of Ethyl, Afton, NewMarket Services, NewMarket Development, and their subsidiaries. We had 2,267 shareholders of record at January 31, 2017.

On October 21, 2015, our Board of Directors approved a share repurchase program authorizing management to repurchase up to $500 million of NewMarket's outstanding common stock until December 31, 2018, as market conditions warrant and covenants under our existing agreements permit. We may conduct the share repurchases in the open market and in privately negotiated transactions. The repurchase program does not require NewMarket to acquire any specific number of shares and may be terminated or suspended at any time. Approximately $447 million remained available under the 2015 authorization at December 31, 2016. No purchases were made during the fourth quarter of 2016 under this authorization.

As shown in the table below, cash dividends declared and paid totaled $6.40 per share for the year ended December 31, 2016 and $5.80 per share for the year ended December 31, 2015.

Year	Date Declared	Date Paid	Per Share Amount
2016	February 25, 2016	April 1, 2016	$ 1.60
	April 28, 2016	July 1, 2016	1.60
	August 11, 2016	October 1, 2016	1.60
	October 27, 2016	January 2, 2017	1.60
2015	February 26, 2015	April 1, 2015	1.40
	April 23, 2015	July 1, 2015	1.40
	August 6, 2015	October 1, 2015	1.40
	October 21, 2015	January 1, 2016	1.60

The declaration and payment of dividends is subject to the discretion of our Board of Directors. Future dividends will depend on various factors, including our financial condition, earnings, cash requirements, legal requirements, restrictions in agreements governing our outstanding indebtedness, and other factors deemed relevant by our Board of Directors.

The following table shows the high and low prices of our common stock on the NYSE for each of the last eight quarters.

	2016			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
High	$402.82	$415.74	$447.97	$435.03
Low	322.54	385.66	399.91	386.90
	2015			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter

High	$482.31	$483.25	$461.24	$419.48
Low	393.25	443.61	349.35	348.38

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The performance graph showing the five-year cumulative total return on our common stock as compared to chemical companies in the S&P 1500 Specialty Chemicals Index and the S&P 500 is shown below. The graph assumes $100 invested on the last day of December 2011, and the reinvestment of all dividends. The graph is based on historical data, and is not intended to be a forecast or indication of future performance of our common stock.

Performance Graph
Comparison of Five-Year Cumulative Total Return
Performance Through December 31, 2016

	December 31,					
	2011	2012	2013	2014	2015	2016
NewMarket Corporation	$100.00	$147.61	$190.63	$233.02	$222.92	$252.10
S&P 1500 Specialty Chemicals Index	100.00	142.16	190.61	221.60	214.70	240.25
S&P 500	100.00	116.00	153.57	174.60	177.01	198.18

The graph and table above are not deemed “filed” with the SEC for purposes of Section 18 of the Exchange Act or otherwise subject to the liabilities of that section, nor are they incorporated by reference into other filings made by us with the SEC.

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ITEM 6. SELECTED FINANCIAL DATA
NewMarket Corporation and Subsidiaries
Five Year Summary

	Years Ended December 31,				
(in thousands, except per-share amounts and percentages)	2016	2015	2014	2013	2012
Results of operations					
Net sales	$2,049,451	$2,140,830	$2,335,405	$2,280,355	$2,211,878
Costs and expenses	1,686,761	1,784,110	1,972,685	1,928,510	1,853,445
Operating profit	362,690	356,720	362,720	351,845	358,433
Interest and financing expenses, net	16,785	14,652	16,567	17,796	8,435
Loss on early extinguishment of debt (1)	0	0	0	0	9,092
Other income (expense), net (2)	(2,697)	(3,097)	(7,054)	7,262	(3,338)
Income from continuing operations before income tax expense	343,208	338,971	339,099	341,311	337,568
Income tax expense	99,767	100,368	105,844	98,964	100,296
Income from continuing operations	243,441	238,603	233,255	242,347	237,272
Income from discontinued operations, net of tax (3)	0	0	0	22,395	2,321
Net income	$243,441	$238,603	$233,255	$264,742	$239,593
Financial position and other data (3)					
Total assets	$1,416,436	$1,286,249	$1,227,733	$1,322,556	$1,259,195
Operations:					
Working capital	$542,293	$504,712	$529,680	$641,438	$510,372
Current ratio	2.84 to 1	2.91 to 1	3.04 to 1	3.59 to 1	3.36 to 1
Depreciation and amortization	$44,893	$42,265	$41,538	$46,144	$43,389
Capital expenditures	$142,874	$126,499	$59,716	$58,476	$38,753
Gross profit as a % of net sales	33.2 %	31.7 %	28.5 %	28.6 %	28.5 %
Research, development, and testing expenses	$156,959	$158,254	$139,183	$136,573	$117,845
Total long-term debt	$507,275	$490,920	$359,334	$344,749	$419,354
Common stock and other shareholders’ equity	$483,251	$387,564	$421,041	$572,448	$402,205
Total long-term debt as a % of total capitalization (debt plus equity)	51.2 %	55.9 %	46.0 %	37.6 %	51.0 %
Common stock					
Basic and diluted earnings per share:					
Income from continuing operations	$20.54	$19.45	$18.38	$18.21	$17.68
Income from discontinued operations (3)	0.00	0.00	0.00	1.69	0.17
Net income	$20.54	$19.45	$18.38	$19.90	$17.85
Equity per share	$40.79	$32.44	$33.83	$43.70	$29.98
Cash dividends declared per share (4)	$6.40	$5.80	$4.70	$3.80	$28.00

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Notes to the Five Year Summary

(1) In March 2012, we entered into a $650 million five-year unsecured revolving credit facility. During 2012, we used a portion of the $650 million revolving credit facility to fund the early redemption of all of our then outstanding 7.125% senior notes (7.125% senior notes), as well as to repay the outstanding principal amount on the Foundry Park I, LLC mortgage loan agreement (mortgage loan). As a result, we recognized a loss on early extinguishment of debt of $10 million in 2012 from accelerated amortization of financing fees associated with the prior revolving credit facility, the 7.125% senior notes, and the mortgage loan, as well as costs associated with redeeming the 7.125% senior notes prior to maturity. Of the loss on early extinguishment of debt, $1 million is included as a component of income from discontinued operations, net of tax.

(2) Other income (expense), net in each year included the gain or loss on the Goldman Sachs interest rate swap, as well as several other small items. The loss on the interest rate swap was $5 million for the year ended December 31, 2016, $3 million for the year ended December 31, 2015, and $7 million for the year ended December 31, 2014. The gain on the interest rate swap was $7 million for the year ended December 31, 2013. The loss on the interest rate swap was $5 million for the year ended December 31, 2012. We terminated the interest rate swap on September 7, 2016, as discussed in Note 14 in the Notes to Consolidated Financial Statements. We did not use hedge accounting to record the interest rate swap, and accordingly, any change in the fair value was immediately recognized in earnings.

(3) On July 2, 2013, Foundry Park I completed the sale of its real estate assets which comprised the entire real estate development segment. The operations of the real estate development segment are reported as discontinued operations. The 2013 amount includes the gain on sale of discontinued business, net of tax, of $22 million. Financial position and cash flow data reflect discontinued operations and continuing operations together.

(4) Cash dividends declared per share for 2012 included a special dividend of $25 per share.

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

Forward-Looking Statements

The following discussion, as well as other discussions in this Annual Report on Form 10-K, contains forward-looking statements about future events and expectations within the meaning of the Private Securities Litigation Reform Act of 1995. We have based these forward-looking statements on our current expectations and projections about future results. When we use words in this document such as "anticipates," "intends," "plans," "believes," "estimates," "projects," "ex "should," "could," "may," "will," and similar expressions, we do so to identify forward-looking statements. Examples of forward-looking statements include, but are not limited to, statements we make regarding future prospects of growth in the petroleum additives market, other trends in the petroleum additives market, our ability to maintain or increase our market share, and our future capital expenditure levels.

We believe our forward-looking statements are based on reasonable expectations and assumptions, within the bounds of what we know about our business and operations. However, we offer no assurance that actual results will not differ materially from our expectations due to uncertainties and factors that are difficult to predict and beyond our control. Factors that could cause actual results to differ materially from expectations include, but are not limited to, the availability of raw materials and distribution systems; disruptions at manufacturing facilities, including single-sourced facilities; the ability to respond effectively to technological changes in our industry; failure to protect our intellectual property rights; failure to attract and retain a highly-qualified workforce; hazards common to chemical businesses; competition from other manufacturers; sudden or sharp raw material price increases; the gain or loss of significant customers; the occurrence or threat of extraordinary events, including natural disasters and terrorist attacks; risks related to operating outside of the United States; the impact of fluctuations in foreign exchange rates; an information technology system failure; political, economic, and regulatory factors concerning our products; future governmental regulation; resolution of environmental liabilities or legal proceedings; and our inability to realize expected benefits from investment in our infrastructure or future acquisitions or our inability to successfully integrate future acquisitions into our business. Risk factors are discussed in Item 1A, "Risk Factors."

You should keep in mind that any forward-looking statement made by us in this discussion or elsewhere speaks only as of the date on which we make it. New risks and uncertainties arise from time to time, and it is impossible for us to predict these events or how they may affect us. We have no duty to, and do not intend to, update or revise the forward-looking statements in this discussion after the date hereof, except as may be required by law. In light of these risks and uncertainties, any forward-looking statement made in this discussion or elsewhere, might not occur.

OVERVIEW

When comparing petroleum additives results in 2016 with 2015, net sales decreased 4.3% resulting primarily from changes in selling prices and foreign currency exchange, despite an increase in shipment volumes. Operating profit improved 2.7% in 2016 over 2015 levels resulting mostly from favorable raw material costs. Our operating profit margin remains strong at 18.9%.

Our operations generate cash that is in excess of the needs of the business. We continue to invest and manage our business for the long-run with the goal of helping our customers succeed in their marketplaces. We invest in organizational talent, technology development and processes, and global infrastructure, consisting of technical centers and supply capability, in support of our business.

During 2016, we repurchased 98,867 shares of our common stock at a total cost of $35.8 million.

In December 2016, we announced our intent to acquire Aditivos Mexicanos, S.A. de C.V. (AMSA) for $182.5 million. AMSA is a petroleum additives manufacturing, sales, and distribution company based in Mexico City, Mexico. We expect to close the transaction in the first half of 2017, pending a regulatory review in Mexico.

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RESULTS OF OPERATIONS

Net Sales

Our consolidated net sales for 2016 amounted to $2.0 billion, a decrease of $91 million, or 4.3% from 2015. The decrease between 2015 and 2014 was $195 million, or 8.3%.

No single customer accounted for 10% or more of our total net sales in 2016 or 2015. Sales to Shell amounted to $261 million (11% of consolidated net sales) in 2014. These sales represented a wide range of products sold to multiple Shell affiliates around the world.

The following table shows net sales by segment and product line for each of the last three years.

	Years Ended December 31,		
(in millions)	2016	2015	2014
Petroleum additives			
Lubricant additives	$1,673	$1,741	$1,901
Fuel additives	362	384	424
Total	2,035	2,125	2,325
All other	14	16	10
Net sales	$2,049	$2,141	$2,335

Petroleum Additives - The regions in which we operate include North America (the United States and Canada), Latin America (Mexico, Central America, and South America), Asia Pacific, and the Europe/Middle East/Africa/India (EMEAI) region. The percentage of net sales being generated in the regions has remained fairly consistent over the past three years, with some limited fluctuation due to various factors, including the impact of regional economic trends. North America represents almost 40% of our petroleum additives net sales, while EMEAI represents a little over 30%. Asia Pacific contributes approximately 20% and Latin America represents almost 10%. As shown in the table above, lubricant additives net sales and fuel additives net sales compared to total petroleum additives net sales has remained substantially consistent over the past three years, although there have been slight increases in the percent of lubricant additives product line net sales over the past three years. The discussion below provides further detail on net sales in our petroleum additives segment for 2016, 2015, and 2014.

The approximate components of the petroleum additives decrease in net sales of $90 million when comparing 2016 to 2015 and $200 million when comparing 2015 to 2014 are shown below in millions.

Net sales for year ended December 31, 2014	$2,325
Lubricant additives shipments	(49)
Fuel additives shipments	15
Selling prices	(76)
Foreign currency impact, net	(90)
Net sales for year ended December 31, 2015	2,125
Lubricant additives shipments	9
Fuel additives shipments	3
Selling prices	(97)
Foreign currency impact, net	(5)
Net sales for year ended December 31, 2016	$2,035

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Petroleum additives net sales for 2016 of $2.0 billion were approximately 4.3% lower than 2015 levels. All regions, except for Asia Pacific, reflected decreased net sales ranging from approximately 2% in EMEAI to about 16% in Latin America. North America experienced an approximate 9% decrease, while Asia Pacific reported an approximate 8% increase in net sales. Lower selling prices were the primary factor of the decrease in petroleum additives net sales when comparing 2016 and 2015, with foreign currency exchange also having an unfavorable impact. The U.S. Dollar strengthened against most of the major currencies in which we transact, including the European Euro and the British Pound Sterling, resulting in an unfavorable impact on net sales when comparing the two years. The Japanese Yen strengthened against the U.S. Dollar during the same time period partially offsetting the unfavorable impact from the other currencies in which we transact. Increases in the volume of product shipments, mostly from fuel additives, along with a favorable impact from product mix, mostly in lubricant additives, partially offset the negative effects of selling prices and foreign currency exchange. The volume of product shipments for petroleum additives increased approximately 1.1% on a worldwide basis when comparing 2016 and 2015. Lubricant additives product shipments increased in both Asia Pacific and EMEAI, but were substantially offset by decreases in North America and Latin America. Fuel additives product shipments increased in all regions, except for EMEAI.

Petroleum additives net sales for 2015 of $2.1 billion were approximately 8.6% lower than 2014 levels. All regions, except for Latin America reflected lower net sales with decreases ranging from approximately 7% in North America and Asia Pacific to 15% in EMEAI. Net sales in Latin America increased about 4%. The most significant factors in the decrease in net sales in 2015 from 2014 levels resulted from an unfavorable foreign currency impact, as well as lower selling prices. From a foreign currency perspective, the U.S. Dollar strengthened against all of the major currencies in which we transact, primarily the European Euro and the Japanese Yen, resulting in an unfavorable foreign currency impact on net sales. The volume of product shipments was substantially unchanged for petroleum additives when comparing 2015 with 2014, reflecting a decrease of just over 1%, but net sales were negatively impacted by mix of products sold. On a worldwide basis, lubricant additives shipments decreased which was partially offset by an increase in fuel additives shipments. The decrease in lubricant additives shipments was across all regions except for Latin America, which increased over 2014 levels. The increase in fuel additives shipments was across all regions except for a small decrease in the Asia Pacific region.

All Other - The “All other” category includes the operations of the TEL business, and certain contracted manufacturing and services performed by Ethyl.

Segment Operating Profit

NewMarket evaluates the performance of the petroleum additives business based on segment operating profit. NewMarket Services expenses are charged to each subsidiary pursuant to services agreements between the companies. Depreciation on segment property, plant, and equipment, as well as amortization of segment intangible assets, is included in segment operating profit.

The table below reports segment operating profit for the last three years. A reconciliation of segment operating profit to income before income tax expense is in Note 21.

	Years Ended December 31,		
(in millions)	2016	2015	2014
Petroleum additives	$385	$375	$385
All other	$0	$4	$1

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Petroleum Additives - Petroleum additives operating profit increased $10 million when comparing 2016 to 2015 and decreased $10 million when comparing 2015 to 2014. Both comparative periods included the impact of the same factors that affected gross profit (see discussion below). In addition to the impact of foreign currency exchange on net sales discussed above, petroleum additives operating profit also included a favorable foreign currency impact when comparing 2016 and 2015, but an unfavorable impact when comparing 2015 and 2014 arising from other transactions. The operating profit margin was 18.9% in 2016, 17.6% in 2015, and 16.6% in 2014. These margins are consistent with our expectations of the performance of our business over the long term. While operating profit margins will fluctuate from quarter to quarter due to multiple factors, we do not operate our business differently from quarter to quarter. We believe the fundamentals of our business and industry are unchanged. Our continued focus is on developing and delivering innovative, technology-driven solutions to our customers.

Gross profit increased $11 million when comparing 2016 and 2015 and decreased $2 million when comparing 2015 and 2014. Cost of sales as a percentage of net sales has remained fairly consistent over the last three years at 67% in 2016, 68% in 2015, and 72% in 2014.

When comparing 2016 and 2015, the primary factor in the improvement in gross profit resulted from a favorable raw material cost variance due to lower costs, which contributed over 100% of the change, along with favorable impacts from the volume variance in product shipments (as discussed in the Net Sales section above), conversion costs, and miscellaneous costs. An unfavorable selling price variance mostly offset the favorable impacts. The sales price variance for the comparative periods included the impact from foreign currency rates as discussed in the Net Sales section above.

When comparing 2015 and 2014, the primary factor in the $2 million decrease in gross profit was a significant unfavorable selling price variance, which contributed over 100% of the change, along with much smaller unfavorable variances in conversion and miscellaneous costs. There was also an unfavorable volume variance in product shipments, as discussed in the Net Sales section above. These unfavorable variances were substantially offset by a significant favorable raw material variance due to lower costs.

Selling, general, and administrative expenses (SG&A) in 2016 were $2 million, or 1%, lower than 2015 levels, while 2015 was $2 million, or 1%, higher than 2014 levels. SG&A as a percentage of net sales was 6.7% in 2016, 6.5% in 2015, and 5.8% in 2014. Our SG&A costs are mainly personnel-related and include salaries, benefits and other costs associated with our workforce. There were no significant changes in these costs when comparing the years.

When comparing 2016 with 2015, R&D decreased approximately $1 million, and when comparing 2015 with 2014, R&D increased approximately $19 million. When comparing 2016 with 2015, investments in R&D in the lubricant additives product line increased, but were more than offset by reductions in the fuel additives product line. For the 2015 to 2014 comparison, the increase was completely in the lubricant additives product line. As a percentage of net sales, R&D was 7.7% in 2016, 7.4% in 2015 and 6.0% in 2014.

Our R&D investments reflect our efforts to support the development of solutions that meet our customers' needs, meet new and evolving standards, and support our expansion into new product areas. Our approach to R&D investment, as it is with SG&A, is one of purposeful spending on programs to support our current product base and to ensure that we develop products to support our customers' programs in the future. R&D investments include personnel-related costs, as well as internal and external testing of our products. Most R&D is incurred in the United States and in the United Kingdom, with over 70% of total R&D being attributable to the North America and EMEAI regions. Substantially all investments in new product development are incurred in the United States and the United Kingdom. The remaining 30% of R&D is attributable to the Asia Pacific and Latin America regions and represents customer technology support services in those regions. All of our R&D is related to the petroleum additives segment.

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The following discussion references certain captions on the Consolidated Statements of Income.

Interest and Financing Expenses

Interest and financing expenses were $17 million in 2016, $15 million in 2015, and $17 million in 2014. The increase in interest and financing expense between 2016 and 2015 resulted primarily from higher average debt. The decrease in interest and financing expenses between 2015 and 2014 resulted from a lower average interest rate, as well as lower amortization and fees, which were offset by higher average debt.

Other Income (Expense), Net

Other income (expense), net was expense of $3 million in both 2016 and 2015, and $7 million in 2014. The amounts for all periods primarily reflected the impact from a derivative instrument representing an interest rate swap recorded at fair value through earnings. As discussed in Note 14, we terminated the interest rate swap on September 7, 2016.

Income Tax Expense

Income tax expense was $100 million in both 2016 and 2015, and $106 million in 2014. The effective tax rate was 29.1% in 2016, 29.6% in 2015, and 31.2% in 2014. The effective income tax rates for each year included the benefit of income in foreign jurisdictions with lower tax rates than the United States, as well as a benefit from the domestic manufacturing tax deduction. The effective tax rates for all years included the domestic R&D tax credit for that year. See Note 19 for further details on income taxes.

When comparing 2016 and 2015, the decrease in the effective income tax rate resulted in lower income tax expense of $2 million, which was substantially offset by higher income before income tax expense.

The lower effective income tax rate in 2015 as compared to 2014 resulted in a decrease of $6 million in income tax expense. The small change in income before income tax expense had no impact on income tax expense.

Our deferred taxes are in a net asset position. Based on current forecasted operating plans and historical profitability, we believe that we will recover nearly the full benefit of our deferred tax assets and have, therefore, only recorded an immaterial valuation allowance at certain foreign subsidiaries.

CASH FLOWS DISCUSSION

We generated cash from operating activities of $353 million in 2016, $268 million in 2015, and $235 million in 2014.

During 2016, we used the $353 million cash generated from operations and $11 million of borrowings on our revolving credit facility to fund $143 million of capital expenditures, fund $76 million in dividend payments, and repurchase $36 million of our common stock. These transactions, along with an unfavorable foreign currency impact of $8 million resulted in an increase of $99 million in cash and cash equivalents. Cash flows from operating activities included an increase of $21 million from lower working capital requirements, as well as contributions of $26 million for our pension and postretirement plans.

During 2015, we used the $268 million cash generated from operations, as well as $131 million of borrowings on our revolving credit facility and $10 million cash-on-hand, to repurchase $195 million of our common stock, fund $126 million of capital expenditures, and fund $71 million in dividend payments. The change in cash also included an unfavorable foreign currency impact of $12 million. Cash flows from operating activities included a decrease of $23 million from higher working capital requirements, as well as contributions of $27 million for our pension and postretirement plans.

During 2014, we used the $235 million cash generated from operations, as well as $136 million cash-on-hand and $14 million of borrowings on our revolving credit facility primarily to repurchase $249 million of our common stock, fund $59 million in dividend payments, and fund $60 million of capital expenditures. The change in cash also included an unfavorable foreign currency impact of $9 million. Cash flows from operating activities included a decrease of $53 million from higher working capital requirements, as well as contributions of $27 million for our pension and postretirement plans.

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We expect that cash from operations, together with borrowing available under our credit facilities, will continue to be sufficient to cover our operating needs and planned capital expenditures for at least the next twelve months.

FINANCIAL POSITION AND LIQUIDITY

Cash

At December 31, 2016, we had cash and cash equivalents of $192 million as compared to $93 million at the end of 2015.

Our cash and cash equivalents held by our foreign subsidiaries amounted to approximately $189 million at December 31, 2016 and $92 million at December 31, 2015. A significant amount, but not all, of these foreign cash balances are associated with earnings that we have asserted are indefinitely reinvested. We plan to use these indefinitely reinvested earnings to support growth outside of the United States through funding of operating expenses, research and development expenses, capital expenditures, and other cash needs of our foreign subsidiaries. Periodically, we repatriate cash from our foreign subsidiaries to the United States through intercompany dividends. These intercompany dividends are paid only by subsidiaries whose earnings we have not asserted are indefinitely reinvested or whose earnings qualify as previously taxed income, as defined by the United States Internal Revenue Code. If circumstances were to change that would cause these indefinitely reinvested earnings to be repatriated, an incremental U.S. tax liability would be incurred. As part of our foreign subsidiary repatriation activities, we received cash dividends from our foreign subsidiaries of $6 million for 2016, $28 million for 2015, and $27 million for 2014. The amount of cash that we repatriate from foreign subsidiaries in any given year is dependent upon many factors, including utilization of available cash in the foreign locations for working capital, capital investments, and other needs.

Debt

4.10% Senior Notes - At both December 31, 2016 and December 31, 2015, we had $350 million of 4.10% senior notes due 2022 which are senior unsecured obligations. The senior notes are registered under the Securities Act of 1933. We incurred financing costs totaling approximately $5 million related to the 4.10% senior notes, which are being amortized over the term of the agreement.

The 4.10% senior notes rank:

- equal in right of payment with all of our existing and future senior unsecured indebtedness; and
- senior in right of payment to any of our future subordinated indebtedness.

The indenture governing the 4.10% senior notes contains covenants that, among other things, limit our ability and the ability of our subsidiaries to:

- create or permit to exist liens;
- enter into sale-leaseback transactions;
- incur additional guarantees; and
- sell all or substantially all of our assets or consolidate or merge with or into other companies.

We were in compliance with all covenants under the indenture governing the 4.10% senior notes as of December 31, 2016 and December 31, 2015.

Revolving Credit Facility – At December 31, 2016, we had a $650 million, multicurrency revolving credit facility, with a $100 million sublimit for multicurrency borrowings, a $75 million sublimit for letters of credit, and a $20 million sublimit for swingline loans pursuant to a credit agreement (Credit Agreement). The Credit Agreement includes an expansion feature which allows us, subject to certain conditions, to request an increase in the aggregate amount of the revolving credit facility or obtain incremental term loans in an amount up to $150 million. Outstanding borrowings under our current revolving credit facility amounted to $156 million at December 31, 2016 and $145 million at December 31, 2015.

We have recorded deferred financing costs of $2.5 million related to the revolving credit facility, which we are amortizing over the term of the Credit Agreement.

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The obligations under the Credit Agreement are unsecured and are fully guaranteed by NewMarket. The revolving credit facility matures on October 28, 2019. On July 15, 2016, we entered into Amendment No.1 to the Credit Agreement. The amendment allows certain of our foreign subsidiaries to borrow under the original Credit Agreement dated as of October 28, 2014. We did not incur significant additional financing fees with the amendment.

Borrowings made under the revolving credit facility bear interest at an annual rate equal to, at our election, either (1) the Alternate Base Rate (ABR) plus the Applicable Rate (solely in the case of loans denominated in U.S. dollars to NewMarket) or (2) the Adjusted LIBO Rate plus the Applicable Rate. ABR is the greatest of (i) the rate of interest publicly announced by the Administrative Agent as its prime rate, (ii) the federal funds effective rate plus 0.5%, or (iii) the Adjusted LIBO Rate for a one month interest period plus 1%. The Adjusted LIBO Rate means the rate at which Eurocurrency deposits in the London interbank market for certain periods (as selected by NewMarket) are quoted, as adjusted for statutory reserve requirements. Depending on our consolidated Leverage Ratio, the Applicable Rate ranges from 0.00% to 0.50% for loans bearing interest based on the ABR and from 1.00% to 1.50% for loans bearing interest based on the Adjusted LIBO Rate. At December 31, 2016, the Applicable Rate was 0.25% for loans bearing interest based on the ABR and 1.25% for loans bearing interest based on the Adjusted LIBO Rate.

The Credit Agreement contains financial covenants that require NewMarket to maintain a consolidated Leverage Ratio (as defined in the Credit Agreement) of no more than 3.50 to 1.00 and a consolidated Interest Coverage Ratio (as defined in the Credit Agreement) of no less than 3.00 to 1.00, calculated on a rolling four quarter basis, as of the end of each fiscal quarter ending on and after December 31, 2014. At December 31, 2016, the Leverage Ratio was 1.28 and the Interest Coverage Ratio was 21.45.

We were in compliance with all covenants under the revolving credit facility at December 31, 2016 and December 31, 2015.

The following table provides information related to the unused portion of our revolving credit facility in effect at December 31, 2016 and December 31, 2015.

(in millions)	December 31, 2016	2015
Maximum borrowing capacity under the revolving credit facility	$650	$650
Outstanding borrowings under the revolving credit facility	156	145
Outstanding letters of credit	3	3
Unused portion of revolving credit facility	$491	$502

The average interest rate for borrowings under our revolving credit facilities was 1.9% during both 2016 and 2015.

Other Borrowings - Our subsidiaries in China have access to short-term lines of credit totaling $28 million. The outstanding balance under these lines was $1 million at December 31, 2016 and $3 million at December 31, 2015. The average interest rate was approximately 3.9% during 2016 and 2.0% during 2015. At December 31, 2016 the interest rate on the drawn amount was 4.1325%. The outstanding balance is due during 2017.

On January 4, 2017, we issued $250 million in senior unsecured notes in a private placement with The Prudential Insurance Company of America and certain other purchasers. These notes bear interest at 3.78% and mature on January 4, 2029. Interest is payable semiannually and principal payments of $50 million are payable annually beginning on January 4, 2025. Under certain conditions, we have the option to prepay the notes. The note purchase agreement contains representations, warranties, terms and conditions customary for transactions of this type. These include negative covenants, certain financial covenants and events of default which are substantially similar to the covenants and events of default in our revolving credit facility.

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We had long-term debt of $507 million at December 31, 2016 and $491 million at December 31, 2015. The increase in debt resulted from additional borrowing of $11 million on the revolving credit facility during 2016, as well as a capital lease.

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As a percentage of total capitalization (total long-term debt and shareholders' equity), our total long-term debt decreased from 55.9% at the end of 2015 to 51.2% at the end of 2016. The change in the percentage was primarily the result of the increase in shareholders' equity, partially offset by an increase in debt. The increase in shareholders' equity reflects our earnings, offset by the impact of stock repurchases, dividend payments, changes in the foreign currency translation adjustment, and a small reduction in the funded position of our defined benefit plan. Normally, we repay any outstanding long-term debt with cash from operations or refinancing activities.

Working Capital

Including cash and cash equivalents and the impact of foreign currency on the balance sheet, at December 31, 2016, we had working capital of $542 million, resulting in a current ratio of 2.84 to 1. Our working capital at December 31, 2015 on the same basis was $505 million, resulting in a current ratio of 2.91 to 1.

Other than the increase in cash and cash equivalents, the most significant changes in working capital since December 31, 2015 primarily reflect decreased inventory along with an increase in accounts payable, which were partially offset by higher accounts receivable. The decrease in inventory was the result of planned reduction in quantity on hand, as well as the impact from lower material cost. The increase in accounts payable was due to timing of payments, as well as higher balances in the Asia Pacific region due to the Singapore plant start-up in 2016. The fluctuation in accounts receivable primarily resulted from lower sales levels in the fourth quarter of 2015 as compared to the same period in 2016.

Capital Expenditures

Capital expenditures were $143 million for 2016, $126 million for 2015, and $60 million for 2014. We expect capital expenditures in 2017 will be similar to the amount spent in 2016. We expect to continue to finance this capital spending through cash on hand and cash provided from operations, together with borrowing available under our $650 million revolving credit facility.

The estimated 2017 capital expenditure amount includes anticipated spending on several improvements to our manufacturing and R&D infrastructure around the world, as well as phase two of our manufacturing facility in Singapore. Phase two will include additional component units and will more than double our investment in the Singapore facility. It is scheduled to be completed in 2017. The investment in the Singapore facility will enable us to more effectively serve our Asia Pacific customers, as well as those in India and the Middle East. The facility is expandable to allow for growth, as demand warrants.

Environmental Expenses

We spent approximately $24 million in 2016, $22 million in 2015, and $22 million in 2014 for ongoing environmental operating and clean-up costs, excluding depreciation of previously capitalized expenditures. These environmental operating and clean-up expenses are primarily included in cost of goods sold. We expect to continue to fund these costs through cash provided by operations.

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Contractual Obligations

The table below shows our year-end contractual obligations by year due.

(in millions)	Payments Due by Period				
	Total	Less than 1 Year	1 - 3 Years	3 - 5 Years	More than 5 Years
Debt obligations (a)	$757	$ 1	$156	$0	$ 600
Interest payable on long-term debt and capital lease obligations	191	27	54	48	62
Letters of credit (b)	3	0	0	0	3
Capital lease obligations (c)	5	0	0	1	4
Operating lease obligations	71	14	21	12	24
Property, plant, and equipment purchase obligations	52	52	0	0	0
Purchase obligations (d)	1,021	151	331	299	240
Other long-term liabilities (e)	44	28	2	2	12
Reserves for uncertain tax positions	9	2	1	6	0
Total	$2,153	$ 275	$565	$368	$ 945

(a) Amounts represent contractual payments due on the 4.10% senior notes, revolving credit facility, and short-term lines of credit as of December 31, 2016. Amounts also include contractual payments due on the Prudential senior unsecured notes issued on January 4, 2017. See Note 11 for more information on long-term debt obligations.

(b) We intend to renew letters of credit when necessary as they mature; therefore, the obligations do not have a definitive maturity date.

(c) Amounts represent the debt obligation under the capital lease related to the Singapore manufacturing facility, as well as future minimum lease payments in excess of the capital lease debt obligation.

(d) Purchase obligations include agreements to purchase goods or services that are enforceable and legally binding and that specify all significant terms, including: fixed or minimum quantities to be purchased; fixed, minimum, or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable without penalty. Purchase orders made in the ordinary course of business are excluded from the above table. Any amounts for which we are liable under purchase orders are reflected in our Consolidated Balance Sheets as accounts payable or accrued expenses.

(e) These represent other long-term liability amounts reflected in our Consolidated Balance Sheets that have known payment streams. Amounts include environmental liabilities, as well as contributions associated with pension and postretirement benefit plans. Amounts accrued for potential exposure with respect to litigation, claims, and assessments are not included in the table above.

Pension and Postretirement Benefit Plans

Our U.S. and foreign benefit plans are discussed separately below. The information applies to all of our U.S. benefit plans. Our foreign plans are quite diverse, and the actuarial assumptions used by the various foreign plans are based upon the circumstances of each particular country and retirement plan. The discussion surrounding our foreign retirement benefits focuses only on our pension plan in the United Kingdom (U.K.), which represents the majority of the impact on our financial statements from foreign pension plans. We use a December 31 measurement date to determine our pension and postretirement expenses and related financial disclosure information. Additional information on our pension and postretirement plans is in Note 17.

U.S. Pension and Postretirement Benefit Plans—The average remaining service period of active participants for our U.S. plans is 13.6 years, while the average remaining life expectancy of inactive participants is 23.7 years. We utilize the sex distinct RP-2014 tables with separate rates for annuitants and non-annuitants, adjusted to remove MP-2014 improvements, with separate rates for annuitants and non-annuitants, projected generationally with Scale MP-2016 in determining the impact of the U.S. benefit plans on our financial statements.

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Investment Return Assumptions and Asset Allocation—We periodically review our assumptions for the long-term expected return on pension plan assets. As part of the review and to develop expected rates of return, we considered an analysis of expected returns based on the U.S. plans' asset allocation as of both January 1, 2017 and January 1, 2016. This analysis reflects our expected long-term rates of return for each significant asset class or economic indicator. As of January 1, 2017, the expected rates were 8.5% for U.S. large cap stocks, 4.4% for fixed income, and 3% for inflation. The range of returns developed relies both on forecasts and on broad-market historical benchmarks for expected return, correlation, and volatility for each asset class.

The asset allocation for our U.S. pension plans is predominantly weighted toward equities. Through the ongoing monitoring of our investments and review of market data, we have determined that we should maintain the expected long-term rate of return for our U.S. pension plans at 8.5% at December 31, 2016.

An actuarial loss occurred during both 2016 and 2015 as the expected investment return for all of our U.S. pension plans exceeded the actual return by approximately $3 million in 2016 and $26 million in 2015. An actuarial gain occurred during 2014 as the actual investment return was higher than the expected return for all of our U.S. pension plans by approximately $1 million. Investment gains and losses are recognized in earnings on an amortized basis over a period of years, resulting in increased expense of approximately $0.1 million in 2017. We expect volatility in pension expense as actual investment returns vary from the expected return, but we continue to believe the potential long-term benefits justify the risk premium for equity investments.

At December 31, 2016, our expected long-term rate of return on our postretirement plans was 5.5%. This rate varies from the pension rate of 8.5% primarily because of the difference in investment of assets. The assets of the postretirement plan are held in an insurance contract, which results in a lower assumed rate of investment return.

Pension expense and the life insurance portion of postretirement expense are sensitive to changes in the expected return on assets. For example, decreasing the expected rate of return by 100 basis points to 7.5% for pension assets and 4.5% for postretirement benefit assets (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.S. pension and postretirement plans by approximately $3 million. Similarly, a 100 basis point increase in the expected rate of return to 9.5% for pension assets and 6.5% for postretirement benefit assets (while holding other assumptions constant) would reduce forecasted 2017 pension and postretirement expense by $3 million.

Discount Rate Assumption—We develop the discount rate assumption by determining the single effective discount rate for a unique hypothetical portfolio constructed from investment-grade bonds that, in the aggregate, match the projected cash flows of each of our retirement plans. The discount rate is developed based on the hypothetical portfolio on the last day of December. The discount rate at December 31, 2016 was 4.25% for all plans.

Pension and postretirement benefit expense is also sensitive to changes in the discount rate. For example, decreasing the discount rate by 100 basis points to 3.25% (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.S. pension and postretirement benefit plans by approximately $6 million. A 100 basis point increase in the discount rate to 5.25% would reduce forecasted 2017 pension and postretirement benefit expense by $5 million.

Rate of Projected Compensation Increase—We have maintained our rate of projected compensation increase at December 31, 2016 at 3.5%. The rate assumption was based on an analysis of our projected compensation increases for the foreseeable future.

Liquidity—Cash contribution requirements to the pension plan are sensitive to changes in assumed interest rates and investment gains or losses in the same manner as pension expense. We expect our aggregate cash contributions, before income taxes, to the U.S. pension plans will be approximately $19 million in 2017. We expect our contributions to the postretirement benefit plans will be approximately $1 million in 2017.

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Foreign Pension Benefit Plans—Our foreign pension plans are quite diverse. The following information applies only to our U.K. pension plan, which represents the majority of the impact on our financial statements from our foreign pension plans. The average remaining service period of active participants for our U.K. plan is 11 years, while the average remaining life expectancy of inactive participants is 25 years. We utilize the S2P (Light) mortality tables and allow for future projected improvements in life expectancy in line with the CMI 2015 model, with a long-term rate of improvement of 1% per year based on the membership of the plan, in determining the impact of the U.K. pension plans on our financial statements.

Investment Return Assumptions and Asset Allocation—We periodically review our assumptions for the long-term expected return on the U.K. pension plan assets. The expected long-term rate of return is based on both the asset allocation, as well as yields available in the U.K. markets.

The target asset allocation in the U.K. is to be invested 55% in pooled equities funds, 40% in pooled government bonds, and 5% in a pooled investment property fund, while the actual allocation at the end of 2016 was 54% in equities, 42% in government bonds, and 4% in a pooled investment property fund. Based on the actual asset allocation and the expected yields available in the U.K. markets, the expected long-term rate of return for the U.K. pension plan was 5.6% at December 31, 2016.

An actuarial gain occurred during 2016 as the actual investment return exceeded the expected investment return by approximately $22 million. An actuarial loss occurred during 2015 as the expected investment return exceeded the actual investment return by approximately $5 million. An actuarial gain of $6 million occurred during 2014. Investment gains and losses are recognized in pension expense on an amortized basis. The amortization of the actuarial net loss is expected to be $0.3 million in 2017. We expect volatility in pension expense as actual investment returns vary from the expected return, but we continue to believe the potential benefits justify the risk premium for the target asset allocation.

Pension expense is sensitive to changes in the expected return on assets. For example, decreasing the expected rate of return by 100 basis points to 4.6% (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.K. pension plan by approximately $1 million. Similarly, a 100 basis point increase in the expected rate of return to 6.6% (while holding other assumptions constant) would reduce forecasted 2017 pension expense by approximately $1 million.

Discount Rate Assumption—We utilize a yield curve based on AA-rated corporate bond yields in developing a discount rate assumption. The yield appropriate to the duration of the U.K. plan liabilities is then used. The discount rate at December 31, 2016 was 2.8%.

Pension expense is also sensitive to changes in the discount rate. For example, decreasing the discount rate by 100 basis points to 1.8% (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.K. pension plans by approximately $1 million. A 100 basis point increase in the discount rate to 3.8% would reduce forecasted 2017 pension expense by approximately $1 million.

Rate of Projected Compensation Increase—Our rate of projected compensation increase at December 31, 2016 is 4.4%. The rate assumption was based on an analysis of our projected compensation increases for the foreseeable future.

Liquidity—Cash contribution requirements to the U.K. pension plan are sensitive to changes in assumed interest rates in the same manner as pension expense. We expect our aggregate U.K. cash contributions, before income taxes, will be approximately $4 million in 2017.

OUTLOOK

We are pleased with the overall performance of our business in 2016. Our stated goal is to provide a 10% return per year for our shareholders over any five-year period (defined by earnings per share growth plus dividends), although we may not necessarily achieve a 10% return each year. We continue to have confidence in our customer-focused strategy and approach to the market. We believe the fundamentals of how we run our business - a long-term view, safety-first culture, customer-focused solutions, technology-driven product offerings, and world-class supply chain capability - will continue to be beneficial for all of our stakeholders.

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We expect our petroleum additives segment to deliver solid performance in 2017, after having posted strong operating results over the past several years. We expect that the petroleum additives industry shipment demand will grow at an average annual rate of 1% to 2% over the long-term, as there have been no significant changes in the positive fundamentals of the industry. Over the long-term, we plan to exceed the industry growth rate.

We have made significant investments to expand our capabilities around the world over the last few years, which have continued in 2016. These investments have been and will continue to be in organizational talent, technology development and processes, and global infrastructure, consisting of technical centers, production capability and geographic expansion. Our investments in support of our customers include completing construction of phase one of our new manufacturing facility in Singapore, ongoing construction of phase two of the facility in Singapore which will more than double our investment there, and entering into a definitive purchase agreement to acquire AMSA, which we plan to complete in the first half of 2017. We intend to utilize these new investments to improve our ability to deliver the solutions that our customers value, expand our global reach, and enhance our operating results. We will continue to invest in our capabilities to provide even better service, technology, and customer solutions.

Our business generates significant amounts of cash beyond what is necessary for the expansion and growth of our current offerings. We are making investments like the ones mentioned above to position ourselves for the future. We regularly review our many internal opportunities to utilize excess cash from a technological, geographic, and product line perspective. We believe our capital spending is creating the capability we need to grow and support our customers worldwide, and our research and development investments are positioning us well to provide added value to our customers. Our primary focus in the acquisition area remains on the petroleum additives industry. It is our view that this industry segment will provide the greatest opportunity for solid returns on our investments while minimizing risk. We remain focused on this strategy and will evaluate any future opportunities. We will continue to evaluate all alternative uses of cash to enhance shareholder value, including stock repurchases and dividends.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

The following discussion highlights some of the more critical areas where a significant change in facts and circumstances in our operating and financial environment could cause a change in future reported financial results.

Income Taxes

We file United States, foreign, state, and local income tax returns. Significant judgment is required in determining our worldwide provision for income taxes and recording the related tax assets and liabilities. Any significant impact as a result of changes in underlying facts, law, tax rates, or tax audits could lead to adjustments to our income tax expense, effective tax rate, financial position, or cash flow.

Deferred income taxes are provided for the estimated income tax effect of temporary differences between the financial statement carrying amounts and the tax basis of existing assets and liabilities, as well as for net operating losses and tax credit carryforwards. When recording these deferred tax assets and liabilities, we must estimate the tax rates we expect will apply to taxable income in the periods in which the deferred tax liability or asset is expected to be settled or realized. In addition, we may record valuation allowances to reduce deferred tax assets if it is more likely than not that some portion or all of the deferred tax assets will not be realized. Judgment is required as we consider the scheduled reversal of deferred tax assets and liabilities, projected future taxable income, and tax planning strategies in making this assessment. If our estimates and assumptions change from those used when we recorded deferred tax assets and liabilities, the effect on our results of operations and financial position could be material.

The income tax returns for our entities in the United States and in foreign jurisdictions are open for examination by tax authorities. We assess our income tax positions and record a liability for all years open for examination based upon our evaluation of the facts, circumstances, and information available at the reporting date. The economic benefit associated with a tax position will be recognized only if we determine it is more likely than not to be upheld on audit. Although we believe our estimates and judgments are reasonable, actual results could differ, resulting in gains or losses that may be material to our results of operations and financial position.

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At each interim reporting period, we estimate an effective income tax rate that is expected to be applicable for the full year. Our provision for income taxes is impacted by the income tax rates of the countries where we operate. A change in the geographical source of our income can affect the effective tax rate. Significant judgment is involved regarding the application of global income tax laws and regulations when projecting the jurisdictional mix of income. Additionally, interpretations of tax laws, court decisions, or other guidance provided by taxing authorities influence our estimate of the effective income tax rate. As a result, our actual effective income tax rate and related income tax liabilities may differ materially from our estimated effective tax rate and related income tax liabilities.

Pension Plans and Other Postretirement Benefits

We use assumptions to record the impact of the pension and postretirement benefit plans in the financial statements. These assumptions include the discount rate, expected long-term rate of return on plan assets, and rate of compensation increase. A change in any one of these assumptions could cause different results for the plans and therefore, impact our results of operations, cash flows, and financial condition. We develop these assumptions after considering available information that we deem relevant. Information is provided on the pension and postretirement plans in Note 17. In addition, further disclosure of the effect of changes in these assumptions is provided in the “Financial Position and Liquidity” section of Item 7.

Environmental and Legal Proceedings

We have disclosed our environmental matters in Item 1 of this Annual Report on Form 10-K, as well as in the Notes to Consolidated Financial Statements. Our estimates for costs that will be incurred to satisfy our obligations related to environmental matters are affected by many variables, including our judgment regarding the extent of remediation that will be required, future changes in and enforcement and interpretation of laws and regulations, current and future technology available, and timing of remediation activities. While we currently do not anticipate significant changes to the many factors that could impact our environmental requirements, we continue to keep our accruals consistent with these requirements as they change.

Also, as noted in the discussion of “Legal Proceedings” in Item 3 of this Annual Report on Form 10-K, while it is not possible to predict or determine with certainty the outcome of any legal proceeding, it is our opinion, based on our current knowledge, that we will not experience any material adverse effects on our results of operations, cash flows, or financial condition as a result of any pending or threatened proceeding.

Intangibles (net of amortization)

We have certain identifiable intangibles amounting to $6 million at December 31, 2016 that are discussed in Note 8. These intangibles relate to our petroleum additives business and are being amortized over periods with up to approximately thirteen years of remaining life. We continue to assess the market related to these intangibles, as well as their specific values, and have concluded the values and amortization periods are appropriate. We also evaluate these intangibles for any potential impairment when significant events or circumstances occur that might impair the value of these assets. These evaluations continue to support the values at which these identifiable intangibles are carried on our financial statements. However, if conditions were to substantially deteriorate in the petroleum additives market, it could possibly cause a decrease in the estimated useful lives of the intangible assets or result in a noncash write-off of all or a portion of the intangibles’ carrying amount. A reduction in the amortization period would have no effect on cash flows. We do not anticipate such a change in the market conditions in the near term.

RECENTLY ISSUED ACCOUNTING STANDARDS

For a full discussion of the more significant pronouncements which may impact our financial statements, see Note 23.

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ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to many market risk factors, including fluctuations in interest and foreign currency rates, as well as changes in the cost of raw materials. These risk factors may affect our results of operations, cash flows, and financial position.

We manage these risks through regular operating and financing methods, including the use of derivative financial instruments. When we have derivative instruments, they are with major financial institutions and are not for speculative or trading purposes. Also, as part of our financial risk management, we regularly review significant contracts for embedded derivatives and, if identified, would record them in accordance with accounting principles generally accepted in the United States.

The following analysis presents the effect on our results of operations, cash flows, and financial position as if the hypothetical changes in market risk factors occurred at December 31, 2016. We analyzed only the potential impacts of our hypothetical assumptions. This analysis does not consider other possible effects that could impact our business.

Interest Rate Risk

At December 31, 2016, we had total long-term debt of $507 million. Of the total debt, $350 million is at fixed rates. There was no interest rate risk at the end of the year associated with the fixed rate debt.

At December 31, 2016, we had $156 million of outstanding variable rate debt under our revolving credit facility. Holding all other variables constant, if the variable portion of the interest rates hypothetically increased 10%, the effect on our earnings and cash flows would have been higher interest expense of approximately $0.1 million.

A hypothetical 100 basis point decrease in interest rates, holding all other variables constant, would have resulted in a change of $19 million in fair value of our debt at December 31, 2016.

Foreign Currency Risk

We sell to customers in foreign markets through our foreign subsidiaries, as well as through export sales from the United States. These transactions are often denominated in currencies other than the U.S. Dollar. Our primary currency exposures are the European Union Euro, British Pound Sterling, Japanese Yen, Chinese Renminbi, Indian Rupee, Singapore Dollar, Mexican Peso, Australian Dollar, and Canadian Dollar. We may enter into forward contracts as hedges to minimize the fluctuation of intercompany accounts receivable denominated in foreign currencies. At December 31, 2016, we had no outstanding forward contracts.

Raw Material Price Risk

We utilize a variety of raw materials in the manufacture of our products, including base oil, polyisobutylene, antioxidants, alcohols, solvents, sulfonates, friction modifiers, olefins, and copolymers. We may also enter into contracts which commit us to purchase some of our more critical raw materials based on anticipated demand. Our profitability is sensitive to changes in the quantities of raw materials we may need and the costs of those materials which may be caused by changes in supply, demand or other market conditions, over which we have little or no control. In addition, political and economic conditions in certain regions of the world in which we operate have caused, and may continue to cause, our demand for and the cost of our raw materials to fluctuate. War, armed hostilities, terrorist acts, civil unrest, or other incidents may also cause a sudden or sharp change in our demand for and the cost of our raw materials. If we experience such increases in the cost of our raw materials, we may not be able to pass them along to our customers in the form of price increases for our products. The inability to do so would have a negative impact on our operating profit. In addition, if our demand for raw materials were to decline such that we would not have need for the quantities required to be purchased under commitment agreements, we could incur additional charges that would affect our profitability.

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ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Report of Independent Registered Public Accounting Firm
To the Board of Directors and Shareholders of NewMarket Corporation:

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of income, comprehensive income, shareholders’ equity and cash flows present fairly, in all material respects, the financial position of NewMarket Corporation and its subsidiaries (the “Company”) at December 31, 2016 and December 31, 2015, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2016 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on these financial statements and on the Company's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included 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. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

A company’s internal control over financial reporting is a process designed 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. A company’s internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) 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 directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting 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 that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP

Richmond, Virginia
February 15, 2017

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NewMarket Corporation and Subsidiaries
Consolidated Statements of Income

	Years Ended December 31,		
(in thousands, except per-share amounts)	2016	2015	2014
Net sales	$2,049,451	$2,140,830	$2,335,405
Cost of goods sold	1,368,690	1,461,774	1,669,982
Gross profit	680,761	679,056	665,423
Selling, general, and administrative expenses	161,112	164,082	163,520
Research, development, and testing expenses	156,959	158,254	139,183
Operating profit	362,690	356,720	362,720
Interest and financing expenses, net	16,785	14,652	16,567
Other income (expense), net	(2,697)	(3,097)	(7,054)
Income before income tax expense	343,208	338,971	339,099
Income tax expense	99,767	100,368	105,844
Net income	$243,441	$238,603	$233,255
Earnings per share - basic and diluted	$20.54	$19.45	$18.38

See accompanying Notes to Consolidated Financial Statements

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NewMarket Corporation and Subsidiaries
Consolidated Statements of Comprehensive Income

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Net income	$243,441	$238,603	$233,255
Other comprehensive income (loss):			
Pension plans and other postretirement benefits:			
Prior service credit (cost) arising during the period, net of income tax expense (benefit) of $(286) in 2016 and $13,913 in 2015	(463)	21,855	0
Amortization of prior service cost (credit) included in net periodic benefit cost (income), net of income tax expense (benefit) of $(1,123) in 2016, $(375) in 2015 and $17 in 2014	(1,801)	(629)	(11)
Actuarial net gain (loss) arising during the period, net of income tax expense (benefit) of $(4,409) in 2016, $(2,477) in 2015 and $(31,282) in 2014	(8,102)	(1,331)	(54,473)
Amortization of actuarial net loss (gain) included in net periodic benefit cost (income), net of income tax expense (benefit) of $2,287 in 2016, $3,052 in 2015 and $1,484 in 2014	3,977	5,426	2,728
Settlements and curtailments, net of income tax expense (benefit) of $608 in 2014	0	0	1,126
Amortization of transition obligation (asset) included in net periodic benefit cost (income), net of income tax expense (benefit) of $1 in 2014	0	0	4
Total pension plans and other postretirement benefits	(6,389)	25,321	(50,626)
Foreign currency translation adjustments, net of income tax expense (benefit) of $(895) in 2016, $(71) in 2015 and $(2,220) in 2014	(31,595)	(30,687)	(28,448)
Other comprehensive income (loss)	(37,984)	(5,366)	(79,074)
Comprehensive income	$205,457	$233,237	$154,181

See accompanying Notes to Consolidated Financial Statements

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NewMarket Corporation and Subsidiaries
Consolidated Balance Sheets

(in thousands, except share amounts)	December 31, 2016	2015
ASSETS		
Current assets:		
Cash and cash equivalents	$192,154	$93,424
Trade and other accounts receivable, net	306,916	287,967
Inventories	311,512	351,631
Prepaid expenses and other current assets	26,301	35,370
Total current assets	836,883	768,392
Property, plant, and equipment, at cost	1,264,957	1,128,989
Less accumulated depreciation and amortization	761,212	726,543
Net property, plant, and equipment	503,745	402,446
Prepaid pension cost	25,800	20,430
Deferred income taxes	29,063	44,729
Intangibles (net of amortization) and goodwill	10,436	10,907
Deferred charges and other assets	10,509	39,345
Total assets	$1,416,436	$1,286,249
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$141,869	$128,745
Accrued expenses	104,082	99,511
Dividends payable	17,478	17,594
Income taxes payable	17,573	12,773
Other current liabilities	13,588	5,057
Total current liabilities	294,590	263,680
Long-term debt	507,275	490,920
Other noncurrent liabilities	131,320	144,085
Total liabilities	933,185	898,685
Commitments and contingencies (Note 16)		
Shareholders' equity:		
Common stock and paid-in capital (without par value; authorized shares - 80,000,000; issued and outstanding - 11,845,972 at December 31, 2016 and 11,948,446 at December 31, 2015)	1,603	0
Accumulated other comprehensive loss	(182,510)	(144,526)
Retained earnings	664,158	532,090
Total shareholders' equity	483,251	387,564
Total liabilities and shareholders' equity	$1,416,436	$1,286,249

See accompanying Notes to Consolidated Financial Statements

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NewMarket Corporation and Subsidiaries
Consolidated Statements of Shareholders' Equity

(in thousands, except share and per-share amounts)	Common Stock and Paid-in Capital Shares	Amount	Accumulated Other Comprehensive Loss	Retained Earnings	Total Shareholders' Equity
Balance at December 31, 2013	13,099,356	$0	$ (60,086)	$632,534	$ 572,448
Net income				233,255	233,255
Other comprehensive income (loss)			(79,074)		(79,074)
Cash dividends ($4.70 per share)				(59,400)	(59,400)
Repurchases of common stock	(664,254)	(2,312)		(246,197)	(248,509)
Stock-based compensation	11,263	2,312		9	2,321
Balance at December 31, 2014	12,446,365	0	(139,160)	560,201	421,041
Net income				238,603	238,603
Other comprehensive income (loss)			(5,366)		(5,366)
Cash dividends ($5.80 per share)				(70,763)	(70,763)
Repurchases of common stock	(501,261)	(3,070)		(194,781)	(197,851)
Tax benefit from stock-based compensation		374			374
Tax withholdings related to stock-based compensation	(3,135)	(3)		(1,196)	(1,199)
Stock-based compensation	6,477	2,699		26	2,725
Balance at December 31, 2015	11,948,446	0	(144,526)	532,090	387,564
Net income				243,441	243,441
Other comprehensive income (loss)			(37,984)		(37,984)
Cash dividends ($6.40 per share)				(75,829)	(75,829)
Repurchases of common stock	(98,867)	(252)		(35,563)	(35,815)
Tax withholdings related to stock-based compensation	(2,582)	(1,076)		0	(1,076)
Stock-based compensation	(1,025)	2,931		19	2,950
Balance at December 31, 2016	11,845,972	$1,603	$ (182,510)	$664,158	$ 483,251

See accompanying Notes to Consolidated Financial Statements

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NewMarket Corporation and Subsidiaries
Consolidated Statements of Cash Flows

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Cash and cash equivalents at beginning of year	$93,424	$103,003	$238,703
Cash flows from operating activities:			
Net income	243,441	238,603	233,255
Adjustments to reconcile net income to cash flows from operating activities:			
Depreciation and amortization	44,893	42,265	41,538
Noncash pension and postretirement expense	12,829	22,037	16,751
Deferred income tax expense	19,185	150	8,208
Unrealized (gain) loss on derivative instruments, net	0	(1,656)	2,179
Change in assets and liabilities:			
Trade and other accounts receivable, net	(38,231)	7,215	(6,891)
Inventories	14,480	(21,747)	(51,827)
Prepaid expenses	8,790	1,464	404
Accounts payable and accrued expenses	18,455	(8,809)	8,059
Book overdrafts	10,149	(8,241)	2,414
Income taxes payable	7,172	6,856	(4,727)
Cash pension and postretirement contributions	(25,898)	(26,813)	(26,505)
Proceeds from legal settlements	0	0	5,150
Realized loss on derivative instruments, net	4,825	4,877	4,946
Other, net	33,344	11,826	2,004
Cash provided from (used in) operating activities	353,434	268,027	234,958
Cash flows from investing activities:			
Capital expenditures	(142,874)	(126,499)	(59,716)
Deposits for interest rate swap	(7,570)	(16,487)	(10,844)
Return of deposits for interest rate swap	11,832	18,140	8,900
Other, net	(4,749)	(4,877)	(4,946)
Cash provided from (used in) investing activities	(143,361)	(129,723)	(66,606)
Cash flows from financing activities:			
Net borrowings under revolving credit facility	11,000	131,000	14,000
Dividends paid	(75,829)	(70,763)	(59,400)
Repurchases of common stock	(35,815)	(194,924)	(248,509)
Other, net	(2,733)	(791)	(1,461)
Cash provided from (used in) financing activities	(103,377)	(135,478)	(295,370)
Effect of foreign exchange on cash and cash equivalents	(7,966)	(12,405)	(8,682)
Increase (decrease) in cash and cash equivalents	98,730	(9,579)	(135,700)
Cash and cash equivalents at end of year	$192,154	$93,424	$103,003

See accompanying Notes to Consolidated Financial Statements

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1. Summary of Significant Accounting Policies

Consolidation—Our consolidated financial statements include the accounts of NewMarket Corporation and its subsidiaries. All intercompany transactions are eliminated upon consolidation. References to "we," "us," "our," the "company," and "NewMarket" are to NewMarket Corporation and its consolidated subsidiaries, unless the context indicates otherwise.

NewMarket is the parent company of three operating companies, each managing its own assets and liabilities. Those companies are Afton, which focuses on petroleum additive products; Ethyl, representing certain contracted manufacturing and services, as well as the TEL business; and NewMarket Development, which manages the property and improvements that we own in Virginia. NewMarket is also the parent company of NewMarket Services, which provides various administrative services to NewMarket, Afton, Ethyl, and NewMarket Development.

Certain reclassifications have been made to the accompanying consolidated financial statements and the related notes to conform to the current presentation.

Foreign Currency Translation—We translate the balance sheets of our foreign subsidiaries into U.S. Dollars based on the current exchange rate at the end of each period. We translate the statements of income using the weighted-average exchange rates for the period. NewMarket includes translation adjustments in the Consolidated Balance Sheets as part of accumulated other comprehensive loss and transaction adjustments in the Consolidated Statements of Income as part of cost of goods sold. Foreign currency transaction adjustments resulted in a net gain of $5 million in 2016, and a net loss of $11 million in 2015, and $4 million in 2014.

Revenue Recognition—Our policy is to recognize revenue from the sale of products when title and risk of loss have transferred to the buyer, the price is fixed and determinable, and collectability is reasonably assured. Net sales (revenues) are reported at the gross amount billed, including amounts related to shipping that are charged to the customer. Provisions for rebates to customers are recorded in the same period that the related sales are recorded. Freight costs incurred on the delivery of products are included in the Consolidated Statements of Income in cost of goods sold. Our standard terms of delivery are included in our contracts, sales order confirmation documents, and invoices. Taxes assessed by a governmental authority concurrent with sales to our customers, including sales, use, value-added, and revenue-related excise taxes, are not included as net sales, but are reflected in accrued expenses until remitted to the appropriate governmental authority.

Cash and Cash Equivalents—Our cash equivalents consist of government obligations and commercial paper with original maturities of 90 days or less. Throughout the year, we have cash balances in excess of federally insured amounts on deposit with various financial institutions. We state cash and cash equivalents at cost, which approximates fair value.

Accounts Receivable—We record our accounts receivable at net realizable value. We maintain an allowance for doubtful accounts for estimated losses resulting from our customers not making required payments. We determine the adequacy of the allowance by periodically evaluating each customer’s receivable balance, considering their financial condition and credit history, and considering current economic conditions. The allowance for doubtful accounts was not material at December 31, 2016 or December 31, 2015.

Inventories—NewMarket values its petroleum additives and TEL inventories at the lower of cost or net realizable value. In the United States, cost is determined on the last-in, first-out (LIFO) basis. In all other countries, we determine cost using the weighted-average method. Inventory cost includes raw materials, direct labor, and manufacturing overhead.

Property, Plant, and Equipment—We state property, plant, and equipment at cost and compute depreciation by the straight-line method based on the estimated useful lives of the assets. We capitalize expenditures for significant improvements that extend the useful life of the related property. We expense repairs and maintenance, including plant turnaround costs, as incurred. When property is sold or retired, we remove the cost and accumulated depreciation from the accounts and any related gain or loss is included in earnings.

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Intangibles (Net of Amortization) and Goodwill—Identifiable intangibles include the cost of acquired contracts, formulas and technology, trademarks and trade names, and customer bases. We assign a value to identifiable intangibles based on independent third-party appraisals and management's assessment at the time of acquisition. NewMarket amortizes the cost of the customer bases by an accelerated method and the cost of the remaining identifiable intangibles by the straight-line method over the estimated economic life of the intangible.

Goodwill arises from the excess of cost over net assets of businesses acquired. Goodwill represents the residual purchase price after allocation to all identifiable net assets. We test goodwill for impairment each year, as well as whenever a significant event or circumstance occurs which could reduce the fair value of the reporting unit to which the goodwill applies below the carrying amount of the reporting unit.

Impairment of Long-Lived Assets—When significant events or circumstances occur that might impair the value of long-lived assets, we evaluate recoverability of the recorded cost of these assets. Assets are considered to be impaired if their carrying amount is not recoverable from the estimated undiscounted future cash flows associated with the assets. If we determine an asset is impaired and its recorded cost is higher than estimated fair market value based on the estimated present value of future cash flows, we adjust the asset to estimated fair market value.

Environmental Costs—NewMarket capitalizes environmental compliance costs if they extend the useful life of the related property or prevent future contamination. Environmental compliance costs also include maintenance and operation of pollution prevention and control facilities. We expense these compliance costs in cost of goods sold as incurred.

Accrued environmental remediation and monitoring costs relate to an existing condition caused by past operations. NewMarket accrues these costs in current operations within cost of goods sold in the Consolidated Statements of Income when it is probable that we have incurred a liability and the amount can be reasonably estimated. These estimates are based on an assessment of the site, available clean-up methods, and prior experience in handling remediation.

When we can reliably determine the amount and timing of future cash flows, we discount these liabilities, incorporating an inflation factor.

Legal Costs—We expense legal costs in the period incurred.

Employee Savings Plan—Most of our full-time salaried and hourly employees may participate in defined contribution savings plans. Employees who are covered by collective bargaining agreements may also participate in a savings plan according to the terms of their bargaining agreements. Employees, as well as NewMarket, contribute to the plans. We made contributions of $7 million in 2016, $6 million in 2015, and $6 million in 2014 related to these plans.

Research, Development, and Testing Expenses—NewMarket expenses all research, development, and testing costs as incurred. R&D costs include personnel-related costs, as well as internal and external testing of our products.

Income Taxes—We recognize deferred income taxes for temporary differences between the financial reporting basis and the income tax basis of assets and liabilities. We also adjust for changes in tax rates and laws at the time the changes are enacted. A valuation allowance is recorded when it is more likely than not that a deferred tax asset will not be realized. We recognize accrued interest and penalties associated with uncertain tax positions as part of income tax expense on our Consolidated Statements of Income.

We generally provide for additional U.S. taxes that would be incurred if a foreign subsidiary returns its earnings in cash to the United States. Undistributed earnings of certain foreign subsidiaries for which U.S. taxes have not been provided totaled approximately $537 million at December 31, 2016, $436 million at December 31, 2015, and $363 million at December 31, 2014. Deferred income taxes have not been provided on these earnings since we expect them to be indefinitely reinvested abroad. Accordingly, no provision has been made for taxes that may be payable on the remittance of these earnings. The determination of the amount of such unrecognized deferred tax liability is not practicable because of the complexities with its hypothetical calculation.

Capital Lease Obligation—We record our capital lease obligations at the lower of fair market value of the related asset at the inception of the lease or the present value of the total minimum lease payments.

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Derivative Financial Instruments and Hedging Activities—We record all derivatives on the balance sheet at fair value. The accounting for changes in the fair value of derivatives depends on the intended use of the derivative, whether we have elected to designate a derivative in a hedging relationship and apply hedge accounting, and whether the hedging relationship has satisfied the criteria necessary to apply hedge accounting. We may enter into derivative contracts that are intended to economically hedge certain of our risks, even though hedge accounting does not apply or we elect not to apply hedge accounting. We do not enter into derivative instruments for speculative purposes. We had no derivative financial instruments outstanding at December 31, 2016.

Stock-based Compensation—We calculate the fair value of restricted stock and restricted stock units based on the closing price of our common stock on the date of grant. If award recipients are entitled to receive dividends during the vesting period, we make no adjustment to the fair value of the award for dividends. If the award does not entitle recipients to dividends during the vesting period, we reduce the grant-date price of our common stock by the present value of the dividends expected to be paid on the underlying shares during the vesting period, discounted at the risk-free interest rate.

We recognize stock-based compensation expense for the number of awards expected to vest on a straight-line basis over the requisite service period.

Estimates and Risks Due to Concentration of Business—The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

In addition, our financial results can be influenced by certain risk factors. Some of our significant concentrations of risk include the following:

- reliance on a small number of significant customers;
- customers concentrated in the fuel and lubricant industries; and
- production of several of our products solely at one facility.

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2. Earnings Per Share

We had 18,114 shares in 2016, 27,434 shares in 2015, and 30,521 shares in 2014 of nonvested restricted stock and restricted stock units that were excluded from the calculation of diluted earnings per share, as their effect on earnings per share would be anti-dilutive.

The nonvested restricted stock is considered a participating security since the restricted stock contains nonforfeitable rights to dividends. As such, we use the two-class method to compute basic and diluted earnings per share for all periods presented since this method yielded a more dilutive result than the treasury-stock method. The following table illustrates the earnings allocation method utilized in the calculation of basic and diluted earnings per share.

	Years Ended December 31,		
(in thousands, except per-share amounts)	2016	2015	2014
Earnings per share numerator:			
Net income attributable to common shareholders before allocation of earnings to participating securities	$243,441	$238,603	$233,255
Earnings allocated to participating securities	477	482	391
Net income attributable to common shareholders after allocation of earnings to participating securities	$242,964	$238,121	$232,864
Earnings per share denominator:			
Weighted-average number of shares of common stock outstanding - basic and diluted	11,828	12,241	12,671
Earnings per share - basic and diluted	$20.54	$19.45	$18.38

3. Supplemental Cash Flow Information

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Cash paid during the year for			
Interest and financing expenses (net of capitalization)	$18,775	$16,193	$16,223
Income taxes	60,998	99,006	112,289
Supplemental disclosure of non-cash transactions			
Release of deposit account funds to terminate interest rate swap	21,868	0	0
Non-cash additions to property, plant, and equipment	8,762	13,959	5,933
Non-cash obligation under capital lease	4,810	0	0

4. Trade and Other Accounts Receivable, Net

	December 31,	
(in thousands)	2016	2015
Trade receivables	$265,991	$252,699
Income tax receivables	26,189	20,141
Other	14,736	15,127
	$306,916	$287,967

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5. Inventories

	December 31,	
(in thousands)	2016	2015
Finished goods and work-in-process	$254,068	$292,978
Raw materials	45,581	48,728
Stores, supplies, and other	11,863	9,925
	$311,512	$351,631

Our U.S. inventories, which are stated on the LIFO basis, amounted to $130 million at December 31, 2016, which was below replacement cost by approximately $39 million. At December 31, 2015, LIFO basis inventories were $147 million, which was approximately $36 million below replacement cost.

Our foreign inventories amounted to $176 million at December 31, 2016 and $196 million at December 31, 2015.

Reserves for obsolete and slow-moving inventory included in the table above were not material at December 31, 2016 or December 31, 2015.

6. Prepaid Expenses and Other Current Assets

	December 31,	
(in thousands)	2016	2015
Dividend funding	$17,478	$17,594
Income taxes on intercompany profit	3,954	12,310
Other	4,869	5,466
	$26,301	$35,370

7. Property, Plant, and Equipment, at Cost

	December 31,	
(in thousands)	2016	2015
Land	$40,190	$41,101
Land improvements	44,048	32,074
Leasehold improvements	1,510	1,516
Buildings	161,512	156,555
Machinery and equipment	915,423	774,857
Construction in progress	102,274	122,886
	$1,264,957	$1,128,989

We depreciate the cost of property, plant, and equipment by the straight-line method over the following estimated useful lives:

Land improvements	5 - 30 years
Buildings	10 - 48 years
Machinery and equipment	3 - 20 years

Depreciation expense was $42 million in 2016, $35 million in 2015, and $34 million in 2014.

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8. Intangibles (Net of Amortization) and Goodwill

The net carrying amount of intangibles and goodwill was $10 million at December 31, 2016 and $11 million at December 31, 2015. The gross carrying amount and accumulated amortization of each type of intangible asset and goodwill are presented in the table below.

	December 31,			
	2016		2015	
(in thousands)	Gross Carrying Amount	Accumulated Amortization	Gross Carrying Amount	Accumulated Amortization
Amortizing intangible assets				
Formulas and technology	$2,678	$ 1,958	$88,763	$ 86,861
Contracts	2,000	0	4,476	4,103
Customer bases	6,938	3,961	6,977	3,627
Trademarks and trade names	1,513	1,069	1,549	923
Goodwill	4,295		4,656	
	$17,424	$ 6,988	$106,421	$ 95,514
Aggregate amortization expense		$ 1,860		$ 5,704

Aggregate amortization expense was $6 million in 2014. All of the intangibles relate to the petroleum additives segment. The change in the gross carrying amount between 2015 and 2016 is due to the following factors:

- Certain intangible assets related to formulas and technology and contracts became fully amortized during 2016, resulting in a decrease in the gross carrying amount and accumulated amortization,
- A contract renewal related to a non-compete agreement, and
- Foreign currency fluctuations.

There is no accumulated goodwill impairment. Estimated annual amortization expense related to our intangible assets for the next five years is expected to be (in thousands):

2017	$864
2018	834
2019	813
2020	504
2021	440

We amortize the contract over 10 years; customer bases over 20 years; formulas and technology over 10 years; and trademarks and trade names over 10 years.

9. Deferred Charges and Other Assets

(in thousands)	December 31, 2016	2015
Asbestos insurance receivables	$4,147	$5,244
Deferred financing costs, net of amortization	1,414	1,914
Interest rate swap deposits	0	26,130
Other	4,948	6,057
	$10,509	$39,345

Deferred financing costs, net of amortization in the table above include only those costs associated with the revolving credit facility. The amount of deferred financing costs, net of amortization related to the 4.10% senior notes is reported as a component of long-term debt. See Note 11 for further information on our long-term debt. We terminated the interest rate swap on September 7, 2016, as discussed in Note 14.

10. Accrued Expenses

(in thousands)	December 31, 2016	2015
Employee benefits, payroll, and related taxes	$33,019	$30,562
Customer rebates	20,944	21,290
Capital projects	18,779	13,927
Taxes other than income and payroll	6,046	7,216
Other	25,294	26,516
	$104,082	$99,511

11. Long-term Debt

(in thousands)	December 31, 2016	2015
Senior notes - 4.10% due 2022 (net of related deferred financing costs)	$ 346,505	$ 345,920
Revolving credit facility	156,000	145,000
Capital lease obligation	4,770	0
	$ 507,275	$ 490,920

4.10% Senior Notes – In 2012, we issued $350 million aggregate principal amount of 4.10% senior notes due 2022 at an issue price of 99.83%. The notes are senior unsecured obligations and are registered under the Securities Act of 1933. We incurred financing costs totaling approximately $5 million related to the 4.10% senior notes, which are being amortized over the term of the agreement.

The 4.10% senior notes rank:

- equal in right of payment with all of our existing and future senior unsecured indebtedness; and
- senior in right of payment to any of our future subordinated indebtedness.

The indenture governing the 4.10% senior notes contains covenants that, among other things, limit our ability and the ability of our subsidiaries to:

- create or permit to exist liens;
- enter into sale-leaseback transactions;
- incur additional guarantees; and
- sell all or substantially all of our assets or consolidate or merge with or into other companies.

We were in compliance with all covenants under the indenture governing the 4.10% senior notes as of December 31, 2016 and December 31, 2015.

Revolving Credit Facility – On October 28, 2014, we entered into a Credit Agreement with a term of five years. The Credit Agreement provides for a $650 million, multicurrency revolving credit facility, with a $100 million sublimit for multicurrency borrowings, a $75 million sublimit for letters of credit, and a $20 million sublimit for swingline loans. The Credit Agreement includes an expansion feature which allows us, subject to certain conditions, to request an increase to the aggregate amount of the revolving credit facility or obtain incremental term loans in an amount up to $150 million.

We have recorded deferred financing costs of $2.5 million related to the credit facility, which we are amortizing over the term of the Credit Agreement.

On July 15, 2016, we entered into Amendment No. 1 to the Credit Agreement. The amendment allows certain of our foreign subsidiaries to borrow under the original Credit Agreement dated as of October 28, 2014. We did not incur significant additional financing fees with the amendment.

The obligations under the Credit Agreement are unsecured and fully guaranteed by NewMarket. The revolving credit facility matures on October 28, 2019.

Borrowings made under the revolving credit facility bear interest at an annual rate equal to, at our election, either (1) the ABR plus the Applicable Rate (solely in the case of loans denominated in U.S. dollars to NewMarket) or (2) the Adjusted LIBO Rate plus the Applicable Rate. ABR is the greatest of (i) the rate of interest publicly announced by the Administrative Agent as its prime rate, (ii) the federal funds effective rate plus 0.5%, or (iii) the Adjusted LIBO Rate for a one month interest period plus 1%. The Adjusted LIBO Rate means the rate at which Eurocurrency deposits in the London interbank market for certain periods (as selected by NewMarket) are quoted, as adjusted for statutory reserve requirements. Depending on our consolidated Leverage Ratio, the Applicable Rate ranges from 0.00% to 0.50% for loans bearing interest based on the ABR and from 1.00% to 1.50% for loans bearing interest based on the Adjusted LIBO Rate. At December 31, 2016, the Applicable Rate was 0.25% for loans bearing interest based on the ABR and 1.25% for loans bearing interest based on the Adjusted LIBO Rate.

The Credit Agreement contains financial covenants that require NewMarket to maintain a consolidated Leverage Ratio (as defined in the Credit Agreement) of no more than 3.50 to 1.00 and a consolidated Interest Coverage Ratio (as defined in the Credit Agreement) of no less than 3.00 to 1.00, calculated on a rolling four quarter basis, as of the end of each fiscal quarter ending on and after December 31, 2014. We were in compliance with all covenants under the revolving credit facility at December 31, 2016 and December 31, 2015.

The following table provides information related to the unused portion of our revolving credit facility in effect at December 31, 2016 and December 31, 2015:

	December 31,	
(in thousands)	2016	2015
Maximum borrowing capacity under the revolving credit facility	$650,000	$650,000
Outstanding borrowings under the revolving credit facility	156,000	145,000
Outstanding letters of credit	3,483	2,895
Unused portion of revolving credit facility	$490,517	$502,105

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The average interest rate for borrowings under our revolving credit facilities was 1.9% during both 2016 and 2015. The average interest rate on outstanding borrowings was 2.1% at December 31, 2016 and December 31, 2015. Outstanding borrowings for the revolving credit facility are due in 2019. None of our remaining outstanding borrowings at December 31, 2016 are due in the next five years.
Capital Lease Obligation – The capital lease obligation is related to the Singapore manufacturing facility.
Other Borrowings - On January 4, 2017, we issued $250 million in senior unsecured notes in a private placement with The Prudential Insurance Company of America and certain other purchasers. These notes bear interest at 3.78% and mature on January 4, 2029. Interest is payable semiannually and principal payments of $50 million are payable annually beginning on January 4, 2025. Under certain conditions, we have the option to prepay the notes. The note purchase agreement contains representations, warranties, terms and conditions customary for transactions of this type. These include negative covenants, certain financial covenants and events of default which are substantially similar to the covenants and events of default in our revolving credit facility.

12. Other Noncurrent Liabilities

	December 31,	
(in thousands)	2016	2015
Employee benefits	$81,377	$77,413
Environmental remediation	13,796	14,907
Asbestos litigation reserve	9,710	9,571
Deferred income taxes	9,234	9,656
Interest rate swaps	0	19,494
Other	17,203	13,044
	$131,320	$144,085

We terminated the interest rate swap on September 7, 2016, as discussed in Note 14.

13. Stock-based Compensation

The 2014 Incentive Compensation and Stock Plan (the Plan) was approved on April 24, 2014 and replaced the 2004 Incentive Compensation and Stock Plan (the Prior Plan). No new awards may be granted under the Prior Plan, but the terms of the Prior Plan continued to govern awards that were issued under the Prior Plan and remained outstanding. All awards outstanding under the Prior Plan vested or were forfeited during 2016.
Any employee of our company or an affiliate or a person who is a member of our Board of Directors or the board of directors of an affiliate is eligible to participate in the Plan if the Compensation Committee of the Board of Directors (the Administrator), in its sole discretion, determines that such person has contributed or can be expected to contribute to the profits or growth of our company or its affiliates (each, a participant). Under the terms of the Plan, we may grant participants stock awards, incentive awards, stock units, or options (which may be either incentive stock options or nonqualified stock options), or stock appreciation rights (SARs), which may be granted with a related option. Stock options entitle the participant to purchase a specified number of shares of our common stock at a price that is fixed by the Administrator at the time the option is granted; provided, however, that the price cannot be less than the shares' fair market value on the date of grant. The maximum period in which an option may be exercised is fixed by the Administrator at the time the option is granted but, in the case of an incentive stock option, cannot exceed ten years. No participant may be granted or awarded, in any calendar year, shares, options, SARs, or stock units covering more than 200,000 shares of our common stock in the aggregate. For purposes of this limitation and the individual limitation on the grant of options, an option and corresponding SAR are treated as a single award.

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The maximum aggregate number of shares of our common stock that may be issued under the Plan is 1,000,000. At December 31, 2016, 981,067 shares were available for grant. During 2016, we granted 720 shares to five of our non-employee directors, which vested immediately.
A summary of activity during 2016 related to NewMarket's restricted stock and restricted stock units (stock awards) is presented below in whole shares:

	Number of Shares	Weighted Average Grant-Date Fair Value
Unvested stock awards at January 1, 2016	27,434	$ 359.48
Vested in 2016	7,575	314.19
Forfeited in 2016	1,745	351.29
Unvested stock awards at December 31, 2016	18,114	379.22

The weighted average grant-date fair value was $375.57 for stock awards granted in 2015 and $381.99 for stock awards granted in 2014. The fair value of shares vested was $3 million in 2016 and $4 million in 2015. We recognized compensation expense of $3 million in 2016, $2 million in 2015, and $2 million in 2014 related to stock awards. At December 31, 2016, total unrecognized compensation expense related to stock awards was $3 million, which is expected to be recognized over a period of 1.7 years.

14. Derivatives and Hedging Activities

We are exposed to certain risks arising from both our business operations and economic conditions. We manage our exposures to a wide variety of business and operational risks through management of our core business activities. We manage certain economic risks, including interest rate, liquidity, and credit risk primarily by managing the amount, sources, and duration of our debt funding, as well as through the use of derivative financial instruments. Specifically, we have entered, and in the future may enter, into interest rate swaps to manage our exposure to interest rate movements.
Our foreign operations expose us to fluctuations of foreign exchange rates. These fluctuations may impact our results of operations, financial position, and cash flows. To manage this exposure, we sometimes enter into foreign currency forward contracts to minimize currency exposure due to cash flows from foreign operations. There were no such contracts outstanding at December 31, 2016 or December 31, 2015.

Non-designated Hedges

On June 25, 2009, we entered into an interest rate swap with Goldman Sachs in the notional amount of $97 million and with a maturity date of January 19, 2022 (Goldman Sachs interest rate swap). We terminated this swap, which had been fully collateralized over the period that it was outstanding, on September 7, 2016 and settled the liability using approximately $22 million of the cash deposit with Goldman Sachs. Under the terms of this interest rate swap, NewMarket made fixed rate payments at 5.3075% and Goldman Sachs made variable rate payments based on three-month LIBOR. Until termination, we collateralized this exposure through cash deposits posted with Goldman Sachs amounting to $26 million at December 31, 2015.
We have made an accounting policy election to not offset derivative fair value amounts with the fair value amounts for the right to reclaim cash collateral under our master netting arrangement. We did not use hedge accounting for the Goldman Sachs interest rate swap, and therefore, immediately recognized any change in the fair value of this derivative financial instrument directly in earnings.

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The table below presents the fair value of our derivative financial instruments, as well as their classification on the Consolidated Balance Sheets.

	Liability Derivatives			
	December 31, 2016		December 31, 2015	
(in thousands)	Balance Sheet Location	Fair Value	Balance Sheet Location	Fair Value
Derivatives Not Designated as Hedging Instruments				
Goldman Sachs interest rate swap	Accrued expenses and Other noncurrent liabilities	$ 0	Accrued expenses and Other noncurrent liabilities	$21,734

The following table presents the effect of our derivative financial instruments on the Consolidated Statements of Income.
Effect of Derivative Instruments on the Consolidated Statements of Income
Not Designated Derivatives
(in thousands)

Derivatives Not Designated as Hedging Instruments	Location of Gain (Loss) Recognized in Income on Derivatives	Amount of Gain (Loss) Recognized in Income on Derivatives		
		Years Ended December 31,		
		2016	2015	2014
Goldman Sachs interest rate swap	Other income (expense), net	$ (4,883)	$ (3,221)	$ (7,125)

15. Fair Value Measurements
The following table provides information on assets and liabilities measured at fair value on a recurring basis. No material events occurred during 2016 requiring adjustment to the recognized balances of assets or liabilities which are recorded at fair value on a nonrecurring basis. As discussed in Note 14, we terminated the interest swap on September 7, 2016.

(in thousands)	Carrying Amount in Consolidated Balance Sheets	Fair Value	Fair Value Measurements Using Level 1	Level 2	Level 3
	December 31, 2016				
Cash and cash equivalents	$192,154	$192,154	$192,154	$ 0	$ 0
	December 31, 2015				
Cash and cash equivalents	$93,424	$93,424	$93,424	$ 0	$ 0
Cash deposit for collateralized interest rate swap	26,130	26,130	26,130	0	0
Interest rate swap liability	21,734	21,734	0	21,734	0

Before the termination of the interest swap, its fair value was determined using the market standard methodology of netting the discounted future fixed cash receipts and the discounted expected variable cash payments. The analysis reflected the contractual term of the derivative, including the period to maturity. The variable cash payments were based on an expectation of future interest rates derived from observable market interest rate curves. In determining the fair value measurements, we incorporated credit valuation adjustments to appropriately reflect both our nonperformance risk and the counterparties' nonperformance risk.

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Although we determined that the majority of the inputs used to value our derivative fell within Level 2 of the fair value hierarchy, the credit valuation adjustment associated with the derivative utilized Level 3 inputs. These Level 3 inputs included estimates of current credit spreads to evaluate the likelihood of default by both us and the counterparties to the derivative. As of December 31, 2015, we assessed the significance of the impact of the credit valuation adjustment on the overall valuation of our derivative and determined that the credit valuation adjustment was not significant to the overall valuation of the derivative. Accordingly, we determined that our derivative valuation should be classified in Level 2 of the fair value hierarchy.

We have made an accounting policy election to measure credit risk of any derivative financial instruments subject to master netting agreements on a net basis by counterparty portfolio.

Long-term debt - We record the carrying amount of our long-term debt at historical cost, less deferred financing costs related to the 4.10% senior notes. The estimated fair value of our long-term debt is shown in the table below and is based primarily on estimated current rates available to us for debt of the same remaining duration and adjusted for nonperformance risk and credit risk. The estimated fair value of our publicly traded 4.10% senior notes included in long-term debt in the table below is based on the last quoted price closest to December 31, 2016. The fair value is categorized as Level 2.

	December 31, 2016		December 31, 2015	
(in thousands)	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Long-term debt (excluding capital lease obligation)	$502,505	$507,925	$490,920	$515,302

16. Commitments and Contingencies

Contractual Commitments—NewMarket has operating lease agreements primarily for office space, land, transportation equipment, and storage facilities. Rental expense was $33 million in 2016, $34 million in 2015, and $30 million in 2014.

Future lease payments for all noncancelable operating leases as of December 31, 2016 are (in thousands):

2017	$14,235
2018	11,698
2019	9,520
2020	6,796
2021	4,776
After 2021	23,515

We have contractual obligations for the construction of assets, as well as purchases of property and equipment, of approximately $52 million at December 31, 2016, all of which are due within five years.

Purchase Obligations—We have purchase obligations for goods or services that are enforceable, legally binding, and specify all significant terms, including: fixed or minimum quantities to be purchased; fixed, minimum, or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable without penalty. Purchase orders made in the ordinary course of business are excluded from this amount. Any amounts for which we are liable under purchase orders are reflected in our Consolidated Balance Sheets as accounts payable or accrued expenses.

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Future payments for purchase obligations as of December 31, 2016 are (in thousands):

2017	$150,740
2018	163,953
2019	167,368
2020	151,066
2021	148,113
After 2021	239,740

Litigation—We are involved in legal proceedings that are incidental to our business and may include administrative or judicial actions. Some of these legal proceedings involve governmental authorities and relate to environmental matters. For further information, see “Environmental” below and Item 1 of this Form 10-K.

While it is not possible to predict or determine with certainty the outcome of any legal proceeding, we believe the outcome of any of these proceedings, or all of them combined, will not result in a material adverse effect on our consolidated results of operations, financial condition, or cash flows.

In late 2013, Afton initiated a voluntary self-audit of its compliance with certain sections of the TSCA under the EPA’s Audit Policy. If any potential TSCA violations are discovered during the audit, we would voluntarily disclose them to the EPA under the Audit Policy. In August 2014, the EPA staff began its own TSCA inspection of both Afton and Ethyl. While it is not possible to predict or determine with certainty the outcome, we do not believe that any findings identified as a result of our audit or the EPA’s TSCA inspection will have a material adverse effect on our consolidated results of operations, financial condition, or cash flows.

Asbestos

We are a defendant in personal injury lawsuits involving exposure to asbestos. These cases involve exposure to asbestos in premises owned or operated, or formerly owned or operated, by subsidiaries of NewMarket. We have never manufactured, sold, or distributed products that contain asbestos. Nearly all of these cases are pending in Texas, Louisiana, or Illinois and involve multiple defendants. We maintain an accrual for these proceedings, as well as a receivable for expected insurance recoveries.

The accrual for our premises asbestos liability related to currently asserted claims is based on the following assumptions and factors:

- We are often one of many defendants. This factor influences both the number of claims settled against us and the indemnity cost associated with such resolutions.
- The estimated percent of claimants in each case that, after discovery, will actually make a claim against us, out of the total number of claimants in a case, is based on a level consistent with past experience and current trends.
- We utilize average comparable plaintiff cost history as the basis for estimating pending premises asbestos related claims. These claims are filed by both former contractors’ employees and former employees who worked at past and present company locations. We also include an estimated inflation factor in the calculation.
- No estimate is made for unasserted claims.
- The estimated recoveries from insurance and Albemarle Corporation (a former operation of our company) for these cases are based on, and are consistent with, the 2005 settlement agreements with Travelers Indemnity Company.

Based on the above assumptions, we have provided an undiscounted liability related to premises asbestos claims of $11 million at both December 31, 2016 and December 31, 2015. The liabilities related to asbestos claims are included in accrued expenses (current portion) and other noncurrent liabilities on the Consolidated Balance Sheets. Certain of these costs are recoverable through the settlement agreement with The Travelers Indemnity Company, as well as an agreement with Albemarle Corporation. The receivable for these recoveries related to premises asbestos liabilities was $5 million at December 31, 2016 and $6 million at December 31, 2015. These receivables are included in trade and other accounts receivable, net on the Consolidated Balance Sheets for the current portion. The noncurrent portion is included in deferred charges and other assets.

Environmental—We are involved in environmental proceedings and potential proceedings relating to soil and groundwater contamination, disposal of hazardous waste, and other environmental matters at several of our current or former facilities, or at third-party sites where we have been designated as a potentially responsible party (PRP). While we believe we are currently adequately accrued for known environmental issues, it is possible that unexpected future costs could have a significant impact on our financial position, results of operations, and cash flows. Our total accruals for environmental remediation, dismantling, and decontamination were approximately $16 million at December 31, 2016 and $17 million at December 31, 2015. Of the total accrual, the current portion is included in accrued expenses and the noncurrent portion is included in other noncurrent liabilities on the Consolidated Balance Sheets.

Our more significant environmental sites include a former TEL plant site in Louisiana (the Louisiana site) and a Houston, Texas plant site (the Texas site). Together, the amounts accrued on a discounted basis related to these sites represented approximately $10 million of the total accrual above at December 31, 2016, using discount rates ranging from 4% to 9%, and $10 million of the total accrual above at December 31, 2015, using discount rates ranging from 3% to 9%. The aggregate undiscounted amount for these sites was $13 million at December 31, 2016 and $14 million at December 31, 2015. Of the total accrued for these two sites, the amount related to remediation of groundwater and soil was $4 million for the Louisiana site and $5 million for the Texas site at December 31, 2016 and $4 million for the Louisiana site and $6 million for the Texas site at December 31, 2015.

In 2000, the EPA named us as a PRP under Superfund law for the clean-up of soil and groundwater contamination at the five grouped disposal sites known as "Sauget Area 2 Sites" in Sauget, Illinois. Without admitting any fact, responsibility, fault, or liability in connection with this site, we are participating with other PRPs in site investigations and feasibility studies. In December 2013, the EPA issued its Record of Decision confirming its remedies for the selected Sauget Area 2 sites. We have accrued our estimated proportional share of the remedial costs and expenses addressed in the Record of Decision. We do not believe there is any additional information available as a basis for revision of the liability that we have established at December 31, 2016. The amount accrued for this site is not material.

17. Pension Plans and Other Postretirement Benefits

NewMarket uses a December 31 measurement date for all of our plans.

U.S. Retirement Plans

NewMarket sponsors four pension plans for all full-time U.S. employees that offer a benefit based primarily on years of service and compensation. Employees do not contribute to these pension plans. The plans are as follows:

- Salaried employees pension plan;
- Afton pension plan for union employees (the Sauget plan);
- NewMarket retirement income plan for union employees in Houston, Texas (the Houston plan); and
- Afton Chemical Additives pension plan for union employees in Port Arthur, Texas (the Port Arthur plan).

In addition, we offer an unfunded, nonqualified supplemental pension plan. This plan restores the pension benefits from our regular pension plans that would have been payable to designated participants if it were not for limitations imposed by U.S. federal income tax regulations.

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We also provide postretirement health care benefits and life insurance to eligible retired employees. A plan amendment, with an effective date of January 1, 2016, was made in 2015 to provide post-65 medical and prescription drug benefits to retirees through a private healthcare exchange with fixed subsidies to eligible retirees through a health reimbursement account. As a result, the postretirement plan liabilities were remeasured at September 1, 2015 resulting in a non-cash improvement in the funded position. The adjustment to accumulated other comprehensive loss is reflected in prior service cost (credit) and is being amortized into expense.
The components of net periodic pension and postretirement benefit cost (income), as well as other amounts recognized in other comprehensive income (loss), are shown below.

	Years Ended December 31,					
	Pension Benefits			Postretirement Benefits		
(in thousands)	2016	2015	2014	2016	2015	2014
Net periodic benefit cost (income)						
Service cost	$12,860	$13,034	$9,608	$705	$2,244	$1,849
Interest cost	13,175	11,938	10,936	1,653	2,548	2,739
Expected return on plan assets	(23,137)	(20,467)	(17,524)	(1,239)	(1,288)	(1,311)
Amortization of prior service cost (credit)	187	99	99	(3,028)	(1,008)	9
Amortization of actuarial net (gain) loss	5,243	6,891	3,825	0	0	(713)
Net periodic benefit cost (income)	8,328	11,495	6,944	(1,909)	2,496	2,573
Other changes in plan assets and benefit obligations recognized in other comprehensive income (loss)						
Actuarial net (gain) loss	9,140	11,095	56,364	156	(1,826)	16,264
Prior service cost (credit)	749	0	0	0	(35,768)	0
Amortization of actuarial net gain (loss)	(5,243)	(6,891)	(3,825)	0	0	713
Amortization of prior service (cost) credit	(187)	(99)	(99)	3,028	1,008	(9)
Total recognized in other comprehensive income (loss)	4,459	4,105	52,440	3,184	(36,586)	16,968
Total recognized in net periodic benefit cost (income) and other comprehensive income (loss)	$12,787	$15,600	$59,384	$1,275	$(34,090)	$19,541

The estimated actuarial net loss to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is expected to be $5 million for pension plans. The estimated prior service cost to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is not expected to be material for pension plans. The estimated prior service credit to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 related to postretirement benefits is expected to be $3 million.

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Changes in the plans' benefit obligations and assets follow.

	December 31,			
	Pension Benefits		Postretirement Benefits	
(in thousands)	2016	2015	2016	2015
Change in benefit obligation				
Benefit obligation at beginning of year	$292,728	$291,119	$38,517	$74,203
Service cost	12,860	13,034	705	2,244
Interest cost	13,175	11,938	1,653	2,548
Actuarial net (gain) loss	6,087	(14,718)	(322)	(1,884)
Plan amendment	748	0	0	(35,770)
Benefits paid	(9,232)	(8,645)	(2,443)	(2,824)
Benefit obligation at end of year	316,366	292,728	38,110	38,517
Change in plan assets				
Fair value of plan assets at beginning of year	260,911	255,571	23,972	24,270
Actual return on plan assets	20,083	(5,346)	761	1,228
Employer contributions	19,330	19,331	948	1,298
Benefits paid	(9,232)	(8,645)	(2,443)	(2,824)
Fair value of plan assets at end of year	291,092	260,911	23,238	23,972
Funded status	$(25,274)	$(31,817)	$(14,872)	$(14,545)
Amounts recognized in the Consolidated Balance Sheets				
Noncurrent assets	$15,188	$7,297	$0	$0
Current liabilities	(2,781)	(2,735)	(1,313)	(1,396)
Noncurrent liabilities	(37,681)	(36,379)	(13,559)	(13,149)
	$(25,274)	$(31,817)	$(14,872)	$(14,545)
Amounts recognized in accumulated other comprehensive loss				
Actuarial net (gain) loss	$107,061	$103,164	$(925)	$(1,081)
Prior service cost (credit)	58	(504)	(31,732)	(34,760)
	$107,119	$102,660	$(32,657)	$(35,841)

The accumulated benefit obligation for all domestic defined benefit pension plans was $272 million at December 31, 2016 and $251 million at December 31, 2015.

The fair market value of plan assets exceeded the accumulated benefit obligation for all domestic plans, except the nonqualified plan, at December 31, 2016 and December 31, 2015. The fair market value of plan assets exceeded the projected benefit obligation for all domestic plans, except the nonqualified plan, at December 31, 2016. The fair market value of plan assets exceeded the projected benefit obligation for all domestic plans, except the Salaried and the nonqualified plan, at December 31, 2015.

The net asset position for plans in which assets exceed the projected benefit obligation is included in prepaid pension cost on the Consolidated Balance Sheets.

The net liability position of plans in which the projected benefit obligation exceeds assets is included in other noncurrent liabilities on the Consolidated Balance Sheets.

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A portion of the accrued benefit cost for the nonqualified plan is included in current liabilities at both December 31, 2016 and December 31, 2015. As the nonqualified plan is unfunded, the amount reflected in current liabilities represents the expected benefit payments related to the nonqualified plan during 2017.

The first table below shows information on domestic pension plans with the accumulated benefit obligation in excess of plan assets. The second table presents information on domestic pension plans with the projected benefit obligation in excess of plan assets.

	December 31,	
(in thousands)	2016	2015
Plans with the accumulated benefit obligation in excess of the fair market value of plan assets		
Projected benefit obligation	$40,462	$37,637
Accumulated benefit obligation	35,939	34,526
Fair market value of plan assets	0	0

	December 31,	
(in thousands)	2016	2015
Plans with the projected benefit obligation in excess of the fair market value of plan assets		
Projected benefit obligation	$ 40,462	$ 232,849
Fair market value of plan assets	0	193,736

There are no assets held by the trustee for the retired beneficiaries of the nonqualified plan. Payments to retired beneficiaries of the nonqualified plan are made with cash from operations.

Assumptions—We used the following assumptions to calculate the results of our retirement plans:

	Pension Benefits			Postretirement Benefits		
	2016	2015	2014	2016	2015	2014
Weighted-average assumptions used to determine net periodic benefit cost (income) for years ended December 31,						
Discount rate	4.500%	4.125%	5.000%	4.500%	4.125%	5.000%
Expected long-term rate of return on plan assets	8.50 %	8.50 %	8.50 %	5.50 %	5.50 %	5.50 %
Rate of projected compensation increase	3.50 %	3.50 %	3.50 %			
Weighted-average assumptions used to determine benefit obligations at December 31,						
Discount rate	4.250%	4.500%	4.125%	4.250%	4.500%	4.125%
Rate of projected compensation increase	3.50 %	3.50 %	3.50 %			

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For pension plans, we base the assumed expected long-term rate of return for plan assets on an analysis of our actual investments, including our asset allocation, as well as an analysis of expected returns. This analysis reflects the expected long-term rates of return for each significant asset class and economic indicator. As of January 1, 2017, the expected rates were 8.5% for U.S. large cap stocks, 4.4% for fixed income, and 3% for inflation. The range of returns relies both on forecasts and on broad-market historical benchmarks for expected return, correlation, and volatility for each asset class. Our asset allocation is predominantly weighted toward equities. Through our ongoing monitoring of our investments and review of market data, we have determined that we should maintain the expected long-term rate of return for our U.S. plans at 8.5% at December 31, 2016. For the postretirement plan, we based the assumed expected long-term rate of return for plan assets on an evaluation of projected interest rates, as well as the guaranteed interest rate for our insurance contract.

Plan Assets—Pension plan assets are held and distributed by trusts and consist principally of equity securities and investment-grade fixed income securities. We invest directly in equity securities, as well as in funds which primarily hold equity and debt securities. Our target allocation is 90% to 97% in equities and 3% to 10% in debt securities or cash.

The pension obligation is long-term in nature and the investment philosophy followed by the Pension Investment Committee is likewise long-term in its approach. The majority of the pension funds are invested in equity securities as historically, equity securities have outperformed debt securities and cash investments, resulting in a higher investment return over the long-term. While in the short-term, equity securities may underperform other investment classes, we are less concerned with short-term results and more concerned with long-term improvement. The pension funds are managed by six different investment companies who predominantly invest in U.S. and international equities. Each investment company’s performance is reviewed quarterly. A small portion of the funds is in investments such as cash or short-term bonds, which historically has been less vulnerable to short-term market swings. These funds are used to provide the cash needed to meet our monthly obligations.

There are no significant concentrations of risk within plan assets, nor do the equity securities include any NewMarket common stock for any year presented.

The assets of the postretirement benefit plan are invested completely in an insurance contract held by Metropolitan Life. No NewMarket common stock is included in these assets.

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The following table provides information on the fair value of our pension and postretirement benefit plans assets, as well as the related level within the fair value hierarchy. Investments that are measured at fair value using the net asset value per share (or its equivalent) practical expedient have not been classified by level in the fair value hierarchy.

	December 31, 2016				December 31, 2015			
		Fair Value Measurements Using				Fair Value Measurements Using		
(in thousands)	Fair Value	Level 1	Level 2	Level 3	Fair Value	Level 1	Level 2	Level 3
Pension Plans								
Equity securities:								
U. S. companies	$232,895	$232,895	$0	$ 0	$211,471	$211,471	$0	$ 0
International companies	1,757	1,757	0	0	9,512	9,512	0	0
Real estate investment trusts	2,653	2,653	0	0	3,339	3,339	0	0
Money market instruments	11,120	11,120	0	0	5,854	5,854	0	0
Pooled investment funds:								
Fixed income securities—mutual funds	8,799	8,799	0	0	8,560	8,560	0	0
International equities—mutual fund	13,104	13,104	0	0	0	0	0	0
Common collective trust measured at net asset value	19,780				19,329			
Cash and cash equivalents	0	0	0	0	1,927	1,927	0	0
Insurance contract	984	0	984	0	919	0	919	0
	$291,092	$270,328	$984	$ 0	$260,911	$240,663	$919	$ 0
Postretirement Plans								
Insurance contract	$23,238	$0	$23,238	$ 0	$23,972	$0	$23,972	$ 0

The valuation methodologies used to develop the fair value measurements for the investments in the table above is outlined below. There have been no changes in the valuation techniques used to value the investments.

- Equity securities, including common stock and real estate investment trusts, are valued at the closing price reported on a national exchange.
- Money market instruments are valued at cost, which approximates fair value.
- Mutual funds are valued at the closing price reported on a national exchange.
- The common collective trust (the trust) is valued at the net asset value of units held based on the quoted market value of the underlying investments held by the fund. The trust invests primarily in a diversified portfolio of equity securities of companies located outside of the United States and Canada, as determined by a company's jurisdiction of incorporation. We may make withdrawals from the trust on the first business day of each month with at least ten business days' notice. There are no restrictions on redemption as of December 31, 2016 or December 31, 2015.
- Cash and cash equivalents are valued at cost.

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- The insurance contracts are unallocated funds deposited with an insurance company and are stated at an amount equal to the sum of all amounts deposited less the sum of all amounts withdrawn, adjusted for investment return.

Cash Flows—For U.S. plans, NewMarket expects to contribute $19 million to our pension plans in 2017. Contributions to our postretirement benefit plans are not expected to be material. The expected benefit payments for the next ten years are as follows.

(in thousands)	Expected Pension Benefit Payments	Expected Postretirement Benefit Payments
2017	$ 10,785	$ 2,908
2018	11,614	2,737
2019	12,505	2,590
2020	13,271	2,449
2021	14,141	2,330
2022 through 2026	85,936	10,400

Foreign Retirement Plans

For most employees of our foreign subsidiaries, NewMarket has defined benefit pension plans that offer benefits based primarily on years of service and compensation. These defined benefit plans provide benefits for employees of our foreign subsidiaries located in Belgium, the United Kingdom, Germany, Canada, and Mexico. NewMarket generally contributes to investment trusts and insurance accounts to provide for these plans.

The components of net periodic pension cost (income), as well as other amounts recognized in other comprehensive income (loss), for these foreign defined benefit pension plans are shown below.

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Net periodic benefit cost (income)			
Service cost	$6,926	$8,150	$6,213
Interest cost	4,915	4,932	5,993
Expected return on plan assets	(6,638)	(7,077)	(8,012)
Amortization of prior service cost (credit)	(83)	(95)	(102)
Amortization of actuarial net (gain) loss	1,021	1,587	1,092
Settlements and curtailments	0	0	1,817
Net periodic benefit cost (income)	6,141	7,497	7,001
Other changes in plan assets and benefit obligations recognized in other comprehensive income (loss)			
Actuarial net (gain) loss	3,215	(5,461)	13,004
Settlements and curtailments	0	0	(1,069)
Amortization of actuarial net gain (loss)	(1,021)	(1,587)	(1,092)
Amortization of prior service (cost) credit	83	95	102
Total recognized in other comprehensive income (loss)	2,277	(6,953)	10,945
Total recognized in net periodic benefit cost (income) and other comprehensive income (loss)	$8,418	$544	$17,946

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The settlements and curtailments amounts for 2014 in the table above reflect the termination of the Canadian Hourly pension plan and the settlement of the Canadian Salary pension plan.
The estimated actuarial net loss to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is expected to be $1 million. The estimated prior service credit expected to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is expected to be $0.1 million. Changes in the benefit obligations and assets of the foreign defined benefit pension plans follow.

	December 31,	
(in thousands)	2016	2015
Change in benefit obligation		
Benefit obligation at beginning of year	$146,748	$158,279
Service cost	6,926	8,150
Interest cost	4,915	4,932
Employee contributions	832	917
Actuarial net (gain) loss	25,794	(10,736)
Benefits paid	(3,501)	(5,203)
Foreign currency translation	(24,613)	(9,591)
Benefit obligation at end of year	157,101	146,748
Change in plan assets		
Fair value of plan assets at beginning of year	138,646	142,986
Actual return on plan assets	29,026	1,923
Employer contributions	5,441	5,981
Employee contributions	832	917
Benefits paid	(3,501)	(5,203)
Foreign currency translation	(25,567)	(7,958)
Fair value of plan assets at end of year	144,877	138,646
Funded status	$(12,224)	$(8,102)
Amounts recognized in the Consolidated Balance Sheets		
Noncurrent assets	$10,612	$13,133
Current liabilities	(295)	(302)
Noncurrent liabilities	(22,541)	(20,933)
	$(12,224)	$(8,102)
Amounts recognized in accumulated other comprehensive loss		
Actuarial net (gain) loss	$42,809	$40,615
Prior service cost (credit)	39	(44)
Transition obligation	10	10
	$42,858	$40,581

The accumulated benefit obligation for all foreign defined benefit pension plans was $132 million at December 31, 2016 and $125 million at December 31, 2015.

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The fair market value of plan assets exceeded both the accumulated benefit obligation and projected benefit obligation for the United Kingdom and the Canadian Salary plans at both year-end 2016 and 2015. The net asset position of the United Kingdom and Canadian Salary plans are included in prepaid pension cost on the Consolidated Balance Sheets at December 31, 2016 and December 31, 2015. The accumulated benefit obligation and projected benefit obligation exceeded the fair market value of plan assets for the German, Belgian, and Mexican plans at December 31, 2016 and December 31, 2015. The accrued benefit cost of these plans is included in other noncurrent liabilities on the Consolidated Balance Sheets.

As the German plan is unfunded, a portion of the accrued benefit cost for the German plan is included in current liabilities at year-end 2016 and 2015, reflecting the expected benefit payments related to the plan for the following year.

The first table below shows information on foreign pension plans with the accumulated benefit obligation in excess of plan assets. The second table shows information on foreign pension plans with the projected benefit obligation in excess of plan assets.

	December 31,	
(in thousands)	2016	2015
Plans with the accumulated benefit obligation in excess of the fair market value of plan assets		
Projected benefit obligation	$32,407	$30,521
Accumulated benefit obligation	21,310	20,005
Fair market value of plan assets	9,568	9,286

	December 31,	
(in thousands)	2016	2015
Plans with the projected benefit obligation in excess of the fair market value of plan assets		
Projected benefit obligation	$ 32,407	$ 30,521
Fair market value of plan assets	9,568	9,286

Assumptions—The information in the table below provides the weighted-average assumptions used to calculate the results of our foreign defined benefit pension plans.

	2016	2015	2014
Weighted-average assumptions used to determine net periodic benefit cost (income) for the years ended December 31,			
Discount rate	3.58%	3.11%	4.01%
Expected long-term rate of return on plan assets	5.10%	5.03%	5.66%
Rate of projected compensation increase	4.28%	4.27%	4.25%
Weighted-average assumptions used to determine benefit obligations at December 31,			
Discount rate	2.53%	3.58%	3.11%
Rate of projected compensation increase	4.20%	4.28%	4.27%

The actuarial assumptions used by the various foreign locations are based upon the circumstances of each particular country and pension plan. The factors impacting the determination of the long-term rate of return for a particular foreign pension plan include the market conditions within a particular country, as well as the investment strategy and asset allocation of the specific plan.

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Plan Assets—Pension plan assets vary by foreign location and plan. Assets are held and distributed by trusts and, depending upon the foreign location and plan, consist primarily of pooled equity funds, pooled corporate and government debt securities funds, a pooled investment property fund, cash, and insurance contracts. The combined weighted-average target allocation of our foreign pension plans is 51% in pooled equity funds, 38% in pooled debt securities funds, 6% in insurance contracts, and 5% in a pooled investment property fund.

While the pension obligation is long-term in nature for each of our foreign plans, the investment strategies followed by each plan vary to some degree based upon the laws of a particular country, as well as the provisions of the specific pension trust. The United Kingdom and Canadian plans are invested predominantly in pooled equity securities funds and pooled debt securities funds. The funds of these plans are managed by various trustees and investment companies whose performance is reviewed throughout the year. The Belgian plan is invested in an insurance contract. The Mexican plan is invested in various mutual funds. The German plan has no assets.

There are no significant concentrations of risk within plan assets, nor do the equity securities include any NewMarket common stock for any year presented.

The following table provides information on the fair value of our foreign pension plans assets, as well as the related level within the fair value hierarchy. Investments that are measured at fair value using the net asset value per share (or its equivalent) practical expedient have not been classified by level in the fair value hierarchy.

	December 31, 2016				December 31, 2015			
		Fair Value Measurements Using				Fair Value Measurements Using		
(in thousands)	Fair Value	Level 1	Level 2	Level 3	Fair Value	Level 1	Level 2	Level 3
Insurance contract	$9,399	$0	$9,399	$ 0	$9,139	$0	$9,139	$ 0
Mutual funds	169	169	0	0	146	146	0	0
Cash and cash equivalents	427	427	0	0	321	321	0	0
Pooled investment funds (measured at net asset value):								
Equity securities—U.S. companies	9,341				9,522			
Equity securities—international companies	64,903				61,588			
Debt securities—corporate	284				22,890			
Debt securities—government	55,273				28,696			
Cash and cash equivalents	349				405			
Property	4,732				5,939			
	$144,877	$596	$9,399	$ 0	$138,646	$467	$9,139	$ 0

The valuation methodologies used to develop the fair value measurements for the investments in the table above are outlined below. There have been no changes in the valuation techniques used to value the investments.

- The insurance contract represents funds deposited with an insurance company and is stated at an amount equal to the sum of all amounts deposited less the sum of all amounts withdrawn, adjusted for investment return.
- Mutual funds are valued at the closing price reported on a national exchange.
- Cash and cash equivalents are valued at cost.

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- The pooled investment funds are valued at the net asset value of units held by the plans based on the quoted market value of the underlying investments held by the fund. The United Kingdom pension plan is invested in units of a property fund and units of life insurance policies that are linked to equity securities funds and government bond funds. The underlying assets of the equity funds and bond funds are traded on a national exchange and are based on tracking various indices of the London Stock Exchange. Both the equity and bond funds can trade 46 days per year with notice of two days prior to the transaction day. The property fund invests primarily in direct United Kingdom commercial property and has no redemption restrictions. There were no unfunded commitments for the United Kingdom pension plan funds. The Canadian pension plan is invested in a pooled Canadian equity fund and a pooled diversified fund. The Canadian equity fund invests in a diversification (sector and industry) of equities listed on a recognized Canadian exchange. The diversified fund invests in a balanced portfolio of marketable securities and controls short-term risk by diversification in equities, bonds and cash. There are no redemption restrictions on the pooled Canadian funds and there were no unfunded commitments.

Cash Flows—For foreign pension plans, NewMarket expects to contribute $5 million to the plans in 2017. The expected benefit payments for the next ten years for our foreign pension plans are shown in the table below.

(in thousands)	Expected Pension Benefit Payments
2017	$ 2,975
2018	3,865
2019	3,276
2020	4,555
2021	3,683
2022 through 2026	22,336

18. Other Income (Expense), Net

Other income (expense), net was expense of $3 million in 2016, $3 million in 2015, and $7 million in 2014, primarily representing losses on the Goldman Sachs interest rate swap derivative instrument recorded at fair value. See Note 14 for additional information on the interest rate swap. We terminated the interest swap on September 7, 2016.

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19. Income Taxes

Our income before income tax expense, as well as our provision for income taxes is shown in the table below.

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Income before income tax expense			
Domestic	$161,687	$229,561	$226,777
Foreign	181,521	109,410	112,322
	$343,208		