CABOT CORP
Form 10-K
November 21, 2018
UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended September 30, 2018

or

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period fromto

Commission File Number 1-5667

Cabot Corporation

(Exact name of Registrant as specified in its Charter)

Delaware	04-2271897
(State or other jurisdiction of	(I.R.S. Employer
incorporation or organization)	Identification No.)
Two Seaport Lane, Suite 1300	
Boston, Massachusetts	02210
(Address of Principal Executive Offices)	(Zip Code)

Registrant's telephone number, including area code: (617) 345-0100

Securities registered pursuant to Section 12(b) of the Securities Exchange Act of 1934: Common Stock, Par Value $1.00 per share, traded on the New York Stock Exchange.

Securities registered pursuant to Section 12(g) of the Securities Exchange Act of 1934: None.

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes No

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

Yes No

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted 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 such files). Yes No

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

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

Large accelerated filer	Accelerated filer
Non-accelerated filer	Smaller reporting company
Emerging growth company	

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

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes No

As of the last business day of the Registrant's most recently completed second fiscal quarter (March 31, 2018), the aggregate market value of the Registrant's common stock held by non-affiliates was $3,409,628,603. As of November 15, 2018, there were 60,029,055 shares of the Registrant's common stock outstanding.

Portions of the Registrant's definitive proxy statement for its 2019 Annual Meeting of Shareholders are incorporated by reference into Part III of this report.

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Information Relating to Forward-Looking Statements

This annual report on Form 10-K contains "forward-looking statements" under the Federal securities laws. These forward-looking statements address expectations or projections about the future, including our expectations regarding our future business performance and overall prospects; segment growth; demand for our products; when we expect construction of our new fumed silica plants in Wuhai, China and Carrollton, Kentucky and the capacity expansion project at our Cilegon, Indonesia facility to be completed; when we expect production to begin at our new facility in Jiangsu Province, China; when we expect to receive cesium ore under our agreement with Pioneer Resources Limited; the sufficiency of our cash on hand, cash provided from operations and cash available under our credit and commercial paper facilities to fund our cash requirements; anticipated capital spending, including environmental-related capital expenditures; cash requirements and uses of available cash, including future cash outlays associated with repaying our debt that matures in December 2018, long-term contractual obligations, restructurings, contributions to employee benefit plans, environmental remediation costs and future respirator liabilities; exposure to interest rate and foreign exchange risk; future benefit plan payments we expect to make; future amortization expenses; the impact we expect tax reform legislation in the U.S. to have on our future after-tax earnings and liquidity position, and our expected tax rate for fiscal 2019; our ability to recover deferred tax assets; and the possible outcome of legal and environmental proceedings. From time to time, we also provide forward-looking statements in other materials we release to the public and in oral statements made by authorized officers.

Forward-looking statements are not guarantees of future performance and are subject to risks, uncertainties, potentially inaccurate assumptions, and other factors, some of which are beyond our control or difficult to predict. If known or unknown risks materialize, our actual results could differ materially from past results and from those expressed in the forward-looking statements. Important factors that could cause our actual results to differ materially from those expressed in our forward-looking statements are described in Item 1A in this report.

We undertake no obligation to publicly update forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law. Investors are advised, however, to consult any further disclosures we make on related subjects in our 10-Q and 8-K reports filed with the Securities and Exchange Commission (the "SEC").

PART I

Item 1. Business

General

Cabot is a global specialty chemicals and performance materials company headquartered in Boston, Massachusetts. Our principal products are rubber and specialty grade carbon blacks, specialty compounds, fumed metal oxides, activated carbons, inkjet colorants, aerogel, cesium formate drilling fluids, and fine cesium chemicals. Cabot and its affiliates have manufacturing facilities and operations in the United States ("U.S.") and over 20 other countries. Cabot's business was founded in 1882 and incorporated in the State of Delaware in 1960. The terms "Cabot", "Company", "we", and "our" as used in this report refer to Cabot Corporation and its consolidated subsidiaries.

Our vision is to be the most innovative, respected and responsible leader in our markets – delivering performance that makes a difference. Our strategy is to extend our leadership in performance materials by investing for growth in our core businesses, driving application innovation with our customers, and generating strong cash flows through efficiency and optimization. Our products are generally based on technical expertise and innovation in one or more of our four core competencies: making and handling very fine particles; modifying the surfaces of very fine particles to alter their functionality; designing particles to impart specific properties to a formulation; and combining particles with other ingredients to deliver a formulated performance intermediate or composite. We focus on creating particles, and formulations of those particles, with the composition, morphology, and surface functionalities to deliver the requisite performance to support our customers' existing and emerging applications.

Our four business segments are: Reinforcement Materials; Performance Chemicals; Purification Solutions; and Specialty Fluids. The business segments are discussed in more detail later in this section.

Our internet address is www.cabotcorp.com. We make available free of charge on or through our website our annual reports 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 soon as reasonably practicable after electronically filing such material with, or furnishing it to, the SEC. Information appearing on our website is not a part of, and is not incorporated in, this Annual Report on Form 10-K.

Reinforcement Materials

Products

Carbon black is a form of elemental carbon that is manufactured in a highly controlled process to produce particles and aggregates of varied structure and surface chemistry, resulting in many different performance characteristics for a wide variety of applications. Rubber grade carbon blacks are used to enhance the physical properties of the systems and applications in which they are incorporated.

Our rubber blacks products are used in tires and industrial products. Rubber blacks have traditionally been used in the tire industry as a rubber reinforcing agent to increase tread durability and are also used as a performance additive to reduce rolling resistance and improve traction. In industrial products such as hoses, belts, extruded profiles and molded goods, rubber blacks are used to improve the physical performance of the product, including the product's physical strength, fluid resistance, conductivity and resistivity.

In addition to our rubber blacks products, we manufacture compounds of carbon black and rubber using our patented elastomer composites manufacturing process. These compounds improve abrasion/wear resistance, reduce fatigue of rubber parts and reduce rolling resistance compared to carbon black/rubber compounds made by conventional dry mix methods.

Sales and Customers

Sales of rubber blacks products are made by Cabot employees and through distributors and sales representatives. Sales to three major tire customers represent a material portion of Reinforcement Materials' total net sales and operating revenues. The loss of any of these customers, or a significant reduction in volumes sold to them, could have a material adverse effect on the segment.

Under appropriate circumstances, we have entered into supply arrangements with certain customers, the typical duration of which is one to two years. Most of these arrangements provide for sales price adjustments to account for changes in relevant feedstock indices and, in some cases, changes in other relevant costs (such as the cost of natural gas). In fiscal 2018, approximately half of our rubber blacks volume was sold under these supply arrangements. The majority of the volumes sold under these arrangements are sold to customers in the Americas and Europe.

We licensed our patented elastomer composites manufacturing process to Manufacture Francaise des Pneumatiques Michelin for their exclusive use in tire applications through fiscal 2017, and for a period of limited exclusivity in tire applications through fiscal 2019. As consideration, we receive quarterly royalty payments extending through calendar year 2022.

Much of the rubber blacks we sell is used in tires and automotive products and, therefore, our financial results may be affected by the cyclical nature of the automotive industry. However, a large portion of the market for our products is in replacement tires that historically have been less subject to automotive industry cycles.

Competition

We are one of the leading manufacturers of carbon black in the world. We compete in the sale of carbon black with two companies that operate globally and numerous other companies that operate regionally, a number of which export product outside their region. Competition for our Reinforcement Materials products is based on product performance, quality, reliability, price, service, technical innovation, and logistics. We believe our product differentiation, technological leadership, global manufacturing presence, operations and logistics excellence and customer service provide us with a competitive advantage.

Raw Materials

The principal raw material used in the manufacture of carbon black is a portion of the residual heavy oils derived from petroleum refining operations, the distillation of coal tars, and the production of ethylene throughout the world. Natural gas is also used in the production of carbon black. Raw materials are, in general, readily available and in adequate supply. Raw material costs generally are influenced by the availability of various types of carbon black feedstock and natural gas, supply and demand of such raw materials and related transportation costs.

Operations

We own, or have a controlling interest in, and operate plants that produce rubber blacks in Argentina, Brazil, Canada, China, Colombia, the Czech Republic, France, Indonesia, Italy, Japan, Mexico, the Netherlands and the U.S. An equity affiliate operates a carbon black plant in Venezuela.

The following table shows our ownership interest as of September 30, 2018 in rubber blacks operations in which we own less than 100%:

Location	Percentage Interest
Shanghai, China	70% (consolidated subsidiary)
Tianjin, China	70% (consolidated subsidiary)
Xingtai City, China	60% (consolidated subsidiary)
Valasske Mezirici (Valmez), Czech Republic	52% (consolidated subsidiary)
Cilegon, Indonesia	98% (consolidated subsidiary)
Valencia, Venezuela	49% (equity affiliate)

In connection with our acquisition of our former joint venture partner's interest in our plant in Altamira, Mexico, we issued the former partner shares of redeemable preferred stock in the Altamira entity. We repurchased the preferred stock in November 2018.

During fiscal 2018, we announced that we will add approximately 160,000 metric tons of capacity through an expansion of our facility in Cilegon, Indonesia. We anticipate that product from this expansion will be available for sale starting in 2021.

Performance Chemicals

Performance Chemicals is composed of two businesses: (i) our Specialty Carbons and Formulations business, which manufactures and sells specialty grades of carbon black, specialty compounds and inkjet colorants and inks, and (ii) our Metal Oxides business, which manufactures and sells fumed silica, fumed alumina and dispersions thereof and aerogel. Beginning October 1, 2018, we will combine the specialty carbons, fumed metal oxides and aerogel product lines into our Performance Additives business, and our specialty compounds and inkjet product lines into our Formulated Solutions business.

In Performance Chemicals, we design, manufacture and sell materials that deliver performance in a broad range of customer applications across the automotive, construction, infrastructure, energy, inkjet printing, electronics, and consumer products sectors.

Products

Specialty Carbons and Formulations Business

Carbon black is a form of elemental carbon that is manufactured in a highly controlled process to produce particles and aggregates of varied structure and surface chemistry, resulting in many different performance characteristics for a wide variety of applications.

Our specialty grades of carbon black are used to impart color, provide rheology control, enhance conductivity and static charge control, provide UV protection, enhance mechanical properties, and provide formulation flexibility through surface treatment. These specialty carbon products are used in a wide variety of applications, such as inks, coatings, plastics, adhesives, toners, batteries, and displays.

Our masterbatch and conductive compound products, which we refer to as "specialty compounds", are formulations derived from specialty grades of carbon black mixed with polymers and other additives. These products are generally used by plastic resin producers and converters in applications for the automotive, industrial, packaging, consumer products, and electronics industries. As an alternative to directly mixing specialty carbon blacks, these formulations offer greater ease of handling and help customers achieve their desired levels of dispersion and color and manage the addition of small doses of additives. In addition, our electrically conductive compound products generally are used to reduce risks associated with electrostatic discharge in plastics applications.

Our inkjet colorants are high-quality pigment-based black and color dispersions based on our patented carbon black surface modification technology. The dispersions are used in aqueous inkjet inks to impart color, sharp print characteristics and durability, while maintaining high printhead reliability. These products are used in various inkjet printing applications, including commercial printing, small office/home office and corporate office, and niche applications that require a high level of dispersibility and colloidal stability. Our inkjet inks, which utilize our pigment-based colorant dispersions, are used in the commercial printing segment for digital print.

Metal Oxides Business

Fumed silica is an ultra-fine, high-purity particle used as a reinforcing, thickening, abrasive, thixotropic, suspending or anti-caking agent in a wide variety of products for the automotive, construction, microelectronics, batteries, and consumer products industries. These products include adhesives, sealants, cosmetics, batteries, inks, toners, silicone elastomers, coatings, polishing slurries and pharmaceuticals. Fumed alumina, also an ultra-fine, high-purity particle, is used as an abrasive, absorbent or barrier agent in a variety of products, such as inkjet media, lighting, coatings, cosmetics and polishing slurries.

Aerogel is a hydrophobic, silica-based particle with a high surface area that is used in a variety of thermal insulation and specialty chemical applications. In the building and construction industry, the product is used in insulative sprayable plasters and composite building products, as well as translucent skylight, window, wall and roof systems for insulating eco-daylighting applications. In the specialty chemicals industry, the product is used to provide matte finishing, insulating and thickening properties for use in a variety of applications.

Sales and Customers

Sales of these products are made by Cabot employees and through distributors and sales representatives. In our Specialty Carbons and Formulations business, sales are generally to a broad number of customers. In our Metal Oxides business, sales under contracts with two customers have accounted for a substantial portion of the revenue.

Competition

We are a leading producer of the products we sell in this segment. We compete in the sale of carbon black with two companies that operate globally and numerous other companies that operate regionally, a number of which export product outside their region. For fumed silica, we compete primarily with two companies with a global presence and several other companies which have a regional presence. For aerogel, we compete principally with one other company that produces aerogel products. We also compete with non-aerogel insulation products manufactured by regional companies throughout the world. We compete with several companies that produce specialty compounds. Our inkjet colorants and inks are designed to replace traditional pigment dispersions and dyes used in inkjet printing applications. Competitive products for inkjet colorants are organic dyes and other dispersed pigments manufactured and marketed by large chemical companies and small independent producers.

Competition for our Performance Chemicals products is based on product performance, quality, reliability, service, technical innovation and price. We believe our product differentiation, technological leadership, operations excellence and customer service provide us with a competitive advantage.

Raw Materials

Raw materials for our products are, in general, readily available and in adequate supply. The principal raw material used in the manufacture of carbon black is a portion of the residual heavy oils derived from petroleum refining operations, the distillation of coal tars, and the production of ethylene throughout the world. Natural gas is also used in the production of carbon black. These raw material costs generally are influenced by the availability of various types of carbon black feedstock and natural gas, supply and demand of such raw materials and related transportation costs.

Raw materials for the production of fumed silica are various chlorosilane feedstocks. We purchase feedstocks and for some customers convert their feedstock to product on a fee-basis (so called "toll conversion"). We also purchase aluminum chloride as feedstock for the production of fumed alumina. We have long-term procurement contracts or arrangements in place for the purchase of fumed silica feedstock, which we believe will enable us to meet our raw material requirements for the foreseeable future. In addition, we buy some raw materials in the spot market to help ensure flexibility and minimize costs. The principal raw materials for the production of aerogel are silica sol and/or sodium silicate.

The primary raw materials used for our specialty compounds include carbon black, primarily sourced from our carbon black plants, thermoplastic resins and mineral fillers supplied from various sources. Raw materials for inkjet colorants include carbon black sourced from our carbon black plants, organic pigments and other treating agents available from various sources. Raw materials for inkjet inks include pigment dispersions, solvents and other additives.

Operations

We own, or have a controlling interest in, and operate plants that produce specialty grades of carbon black primarily in China, the Netherlands and the U.S. We also own, or have a controlling interest in, manufacturing plants that produce fumed metal oxides in China, Germany, the United Kingdom (“U.K”), and the U.S. and a manufacturing plant that produces aerogel in Frankfurt, Germany. An equity affiliate operates a fumed metal oxides plant in India. Our specialty compounds are produced in facilities that we own, or have a controlling interest in, located in Belgium, Canada, China and the United Arab Emirates. Our inkjet colorants and inks are manufactured at our facility in Haverhill, Massachusetts.

The following table shows our ownership interest as of September 30, 2018 in these segment operations in which we own less than 100%:

Location	Percentage Interest
Tianjin, China	90% (consolidated subsidiary)
Jiangxi Province, China	90% (consolidated subsidiary)
Mettur Dam, India	50% (equity affiliate)

As part of our strategy to invest for growth in our core businesses, we have announced a number of capacity expansions. In September 2018, we acquired NSCC Carbon (Jiangsu) Co., Ltd. from Nippon Steel Carbon Co., Ltd., a subsidiary of Nippon Steel Chemical & Material Co., Ltd. We plan to modify this 50,000-metric ton manufacturing facility in Pizhou, Jiangsu Province, China to produce specialty carbons, and expect production to begin in 2021. In addition, during fiscal 2018, we purchased Tech Blend, a leading North American producer of black masterbatches, extending our geographic footprint in black masterbatch and compounds. The acquisition added a manufacturing facility in Saint-Jean-sur-Richelieu, Québec, Canada to our manufacturing network.

We also continue to expand our fumed silica manufacturing capacity. During fiscal 2016, we entered into an agreement with Inner Mongolia Hengyecheng Silicone Co., Ltd ("HYC") to build a fumed silica manufacturing facility in Wuhai, China in which we will hold an 80% interest and HYC will hold the remaining 20% interest. Construction of the plant began in June 2017, and we expect the plant to be completed in 2019. In addition, in fiscal 2017, we entered into an agreement with DowDuPont ("Dow") to build a fumed silica manufacturing facility in Carrollton, Kentucky, U.S. adjacent to the existing Dow silicone monomer plant. Construction of the plant began in September 2017, and we expect the plant to be completed in 2020.

Purification Solutions

Products

Activated carbon is a porous material consisting mainly of elemental carbon treated with heat, steam and/or chemicals to create high internal porosity, resulting in a large internal surface area that resembles a sponge. It is generally produced in two forms, powdered and granular, and is manufactured in different sizes, shapes and levels of purity and using a variety of raw materials for a wide variety of applications. Activated carbon is used to remove contaminants from liquids and gases using a process called adsorption, whereby the interconnected pores of activated carbon trap contaminants.

Our activated carbon products are used for the purification of water, air, food and beverages, pharmaceuticals and other liquids and gases, as either a colorant or a decolorizing agent in the manufacture of products for food and beverage applications and as a chemical carrier in slow release applications. In gas and air applications, one of the uses of activated carbon is for the removal of mercury in flue gas streams. In certain applications, used activated carbon can be reactivated for further use by removing the contaminants from the pores of the activated carbon product. The most common applications for our reactivated carbon are water treatment and food and beverage purification. In addition to our activated carbon production and reactivation, we also provide activated carbon solutions through on-site equipment and services, including delivery systems for activated carbon injection in coal-fired utilities, mobile water filter units and carbon reactivation services.

Sales and Customers

Sales of activated carbon are made by Cabot employees and through distributors and sales representatives to a broad range of customers, including coal-fired utilities, food and beverage processors, water treatment plants, pharmaceutical companies and catalyst producers. Some of our sales of activated carbon are made under annual contracts or longer-term agreements, particularly in mercury removal applications.

Competition

We are one of the leading manufacturers of activated carbon in the world. We compete in the manufacture of activated carbon with a number of companies, some of which have a global presence and others that have a regional or local presence, although not all of these companies manufacture activated carbon for the range of applications for which we sell our products.

Competition for activated carbon and activated carbon equipment and services is based on quality, price, performance, and supply-chain stability. We believe our commercial strengths include our product and application diversity, product differentiation, technological leadership, quality, cost-effective access to raw materials and scalable manufacturing capabilities.

Raw Materials

The principal raw materials we use in the manufacture of activated carbon are various forms of coal, including lignite, wood and other carbonaceous materials, which are, in general, readily available and we believe we have in adequate supply. We also own a lignite mine that is operated by Caddo Creek Resources Company, LLC, a subsidiary of the North American Coal Company, which supplies our Marshall, Texas facility.

Operations

We own, or have a controlling interest in, and operate plants that produce activated carbon in Italy, the Netherlands, the U.K. and the U.S. Our affiliates operate activated carbon plants in Canada and Mexico, and during fiscal 2018 we entered into a joint venture with Eco Industrial Environmental Engineering Pte. Ltd. to construct and operate a reactivation manufacturing plant in Singapore for the manufacture and sale of reactivated carbon. The following table shows our ownership interest as of September 30, 2018 in activated carbon operations in which we own less than 100%:

Location	Percentage Interest
Estevan, Saskatchewan, Canada	50% (contractual joint venture)
Atitalaquia, Hidalgo, Mexico	49% (equity affiliate)
Republic of Singapore	35% (equity affiliate)

Specialty Fluids

Products

Our Specialty Fluids segment produces and markets a range of cesium products that include cesium formate brines and other fine cesium chemicals.

Cesium formate brines are used as a drilling and completion fluid primarily in high pressure and high temperature oil and gas well construction. Cesium formate products are solids-free, high-density fluids that have a low viscosity, enabling safe and efficient well construction and workover operations. The fluid is resistant to high temperatures, minimizes damage to producing reservoirs and is readily biodegradable in accordance with the testing guidelines set by the Organization for Economic Cooperation and Development. In a majority of applications, cesium formate is blended with other formates or products.

Fine cesium chemicals are used across a wide range of industries and applications that include catalysts, doping agents and brazing fluxes. Fine cesium chemicals enable process performance benefits and yield improvements, and help prevent or mitigate pollution in the applications they serve.

Sales, Rental and Customers

Sales of our cesium formate products are made to oil and gas operating companies directly by Cabot employees and sales representatives and indirectly through oil field service companies. We generally rent cesium formate to our customers for use in drilling operations on a short-term basis and on occasion make direct sales of cesium formate outside of the rental process. After completion of a job under our rental process, the customer returns the remaining fluid to Cabot and it is reprocessed for use in subsequent well operations. Any fluid that is not returned to Cabot is paid for by the customer.

In prior years, a large portion of our fluids has been used for drilling and completion of wells in the North Sea with a limited number of customers, where we have supplied cesium formate-based fluids for both reservoir drilling and completion activities on large gas and condensate field projects in the Norwegian Continental Shelf. In fiscal 2018 we expanded the use of our fluids to drilling operations outside of the North Sea, particularly in Asia/the Middle East.

Sales of our fine cesium chemicals are made by Cabot employees and through distributors and sales representatives.

Competition

Formate fluids compete mainly with traditional drilling fluid technologies. Competition in the well fluids business is based on product performance, quality, reliability, service, technical innovation, price, and proximity of inventory to customers' drilling operations. We believe our commercial strengths include our unique product offerings and their performance, and our customer service.

We are one of the leading manufacturers of fine cesium chemicals in the world and compete in the manufacture of fine cesium chemicals with multiple companies. We also compete with other technical solutions, which differ by application.

Raw Materials

The principal raw material used in this business is pollucite (cesium ore), of which we own, at our mine in Manitoba, Canada, a substantial portion of the world's known reserves. In November 2015 we completed a development project at the mine, and in fiscal 2018 we completed an additional infrastructure improvement and mining project. We are continuing to assess options to access additional reserves in the mine, various technologies to augment our cesium supply and alternative sources of ore as demand for our cesium products warrants. In addition, during fiscal 2018, we entered into an offtake agreement with Pioneer Resources Limited to purchase 100% of the cesium ore extracted from the Sinclair Zone Cesium Deposit in Australia. We expect to receive this cesium ore in fiscal 2019. We believe we have sufficient raw material to enable us to continue to supply cesium products for the foreseeable future, based on our anticipated consumption.

Most oil and gas well construction jobs for which cesium formate is used require a large volume of the product. Accordingly, the Specialty Fluids business maintains a large supply of fluid.

Operations

Our mine and cesium formate and fine cesium chemical manufacturing facility are located in Manitoba, Canada, and we have fluid blending and reclamation facilities in Aberdeen, Scotland and in Bergen, Norway. In addition, we warehouse fluid and fine cesium chemical products at various locations around the world to support existing and potential operations.

Patents and Trademarks

We own and are a licensee of various patents, which expire at different times, covering many of our products as well as processes and product uses. Although the products made and sold under these patents and licenses are important to Cabot, the loss of any particular patent or license would not materially affect our business, taken as a whole. We sell our products under a variety of trademarks we own and take reasonable measures to protect them. While our trademarks are important to Cabot, the loss of any one of our trademarks would not materially affect our business, taken as a whole.

Seasonality

Our businesses are generally not seasonal in nature, although we may experience some regional seasonal declines during holiday periods and some weather-related seasonality in Purification Solutions.

Backlog

We do not consider backlog to be a significant indicator of the level of future sales activity. In general, we do not manufacture our products against a backlog of orders. Production and inventory levels are based on the level of incoming orders as well as projections of future demand. Therefore, we believe that backlog information is not material to understanding our overall business and is not a reliable indicator of our ability to achieve any particular level of revenue or financial performance.

Employees

As of September 30, 2018, we had approximately 4,600 employees. Some of our employees in the U.S. and abroad are covered by collective bargaining or similar agreements. We believe that our relations with our employees are generally satisfactory.

Safety, Health and Environment (“SH&E”)

Cabot has been named as a potentially responsible party under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (the “Superfund law”) and comparable state statutes with respect to several sites primarily associated with our divested businesses. (See “Legal Proceedings” below.) During the next several years, as remediation of various environmental sites is carried out, we expect to spend against our $15 million environmental reserve for costs associated with such remediation. Adjustments are made to the reserve based on our continuing analysis of our share of costs likely to be incurred at each site. Inherent uncertainties exist in these estimates due to unknown conditions at the various sites, changing governmental regulations and legal standards regarding liability, and changing technologies for handling site investigation and remediation. While the reserve represents our best estimate of the costs we expect to incur, the actual costs to investigate and remediate these sites may exceed the amounts accrued in the environmental reserve. While it is always possible that an unusual event may occur with respect to a given site and have a material adverse effect on our results of operations in a particular period, we do not believe that the costs relating to these sites, in the aggregate, are likely to have a material adverse effect on our consolidated financial position. Furthermore, it is possible that we may also incur future costs relating to environmental liabilities not currently known to us or as to which it is currently not possible to make an estimate.

Our ongoing operations are subject to extensive federal, state, local, and foreign laws, regulations, rules, and ordinances relating to safety, health, and environmental matters ("SH&E Requirements"). These SH&E Requirements include requirements to obtain and comply with various environmental-related permits for constructing any new facilities and operating all of our existing facilities and for product registrations. We have expended and will continue to expend considerable sums to construct, maintain, operate, and improve facilities for safety, health and environmental protection and to comply with SH&E Requirements. We spent approximately $45 million in environmental-related capital expenditures at existing facilities in fiscal 2018. We anticipate spending approximately $46 million for such matters in fiscal 2019, a significant portion of which will be for the installation of air pollution control equipment and wastewater infrastructure improvements at certain of our plants.

In recognition of the importance of compliance with SH&E Requirements to Cabot, our Board of Directors has a Safety, Health, Environmental, and Sustainability Committee. The Committee, which is comprised of a majority of independent directors, generally meets four times a year and oversees aspects of our sustainability program, including safety, health, and environmental performance, process safety, security, product stewardship, community engagement and governmental affairs. In particular, the Committee reviews metrics, audit results, emerging trends, overall performance, risks and opportunity assessments and management processes related to our safety, health, environmental and sustainability program.

The International Agency for Research on Cancer (“IARC”) classifies carbon black as a Group 2B substance (known animal carcinogen, possible human carcinogen). We have communicated IARC’s classification of carbon black to our customers and employees and have included that information in our safety data sheets and elsewhere, as appropriate. We continue to believe that the available evidence, taken as a whole, indicates that carbon black is not carcinogenic to humans, and does not present a health hazard when handled in accordance with good housekeeping and safe workplace practices as described in our safety data sheets.

REACH (Registration, Evaluation and Authorization of Chemicals), the European Union (“EU”) regulatory framework for chemicals developed by the European Commission (“EC”), applies to all chemical substances produced or imported into the EU in quantities greater than one metric ton a year. Manufacturers or importers of these chemical substances are required to submit specified health, safety, risk and use information about the substance to the European Chemical Agency. We have completed all required registrations under REACH to date and will continue to complete the registrations under REACH for our products in accordance with future registration deadlines. In addition, the EC recommended definition of nanomaterial is under review and an updated definition may be included in existing and future regulations. This definition, which may be used in the EU to identify materials for which special provisions such as risk assessment and ingredient labeling may be required, could apply to many of our existing products including carbon black, fumed silica, inkjet pigments and fumed alumina. Country-specific nanomaterial reporting programs have been implemented in some countries and are being developed by others. We will continue to monitor and address these requirements.

Environmental agencies worldwide are increasingly implementing regulations and other requirements resulting in more restrictive air emission limits globally, particularly as they relate to nitrogen oxide, sulphur dioxide and particulate matter emissions. In addition, global efforts to reduce greenhouse gas emissions impact the carbon black and activated carbon industries as carbon dioxide is emitted from those manufacturing processes. In Europe, the EU Emission Trading Scheme applies to our four carbon black facilities and one activated carbon facility. In China, two of our carbon black facilities participate in regional pilot greenhouse gas emissions trading programs associated with the development of a national trading program. The national program was implemented on a limited scale in 2018, with broader applicability expected in 2020. In Canada, our carbon black manufacturing facility was subject to the Province of Ontario’s emissions trading program, which was eliminated in 2018. That facility will be subject to the backstop Canadian carbon tax program beginning in 2019, which is still being determined. In Mexico, our carbon black facility will be subject to the recently announced cap and trade pilot program. In other regions where we operate, some of our facilities are required to report their greenhouse gas emissions, but are not currently subject to programs requiring trading or emission controls. We generally expect to purchase emission credits where necessary to respond to allocation shortfalls. In addition, air emission regulations may be adopted in the future in other regions and countries where we operate, which could have an impact on our operations. Increasing regulatory programs associated with greenhouse gas emissions and concerns regarding climate change could increase operational costs in the future.

A number of organizations and regulatory agencies have become increasingly focused on the issue of water scarcity and water quality, particularly in certain geographic regions. We are engaged in various activities to promote water conservation and wastewater recycling. The costs associated with these activities are not expected to have a material adverse effect on our operations.

Various U.S. agencies and international bodies have adopted security requirements applicable to certain manufacturing and industrial facilities and marine port locations. These security-related requirements involve the preparation of security assessments and security plans in some cases, and in other cases the registration of certain facilities with specified governmental authorities. We closely monitor all security-related regulatory developments and believe we are in compliance with all existing requirements. Compliance with such requirements is not expected to have a material adverse effect on our operations.

Item 1A. Risk Factors

In addition to factors described elsewhere in this report, the following are important factors that could adversely affect our business. The risks described below are not the only risks we face. Additional risks not presently known to us or that we currently deem immaterial may also impair our business operations and financial results.

Negative or uncertain worldwide or regional economic conditions or trade relations may adversely impact our business.

Our operations and performance are affected by worldwide and regional economic conditions. Uncertainty or a deterioration in the economic conditions affecting the businesses to which, or geographic areas in which, we sell products could reduce demand for our products. We may also experience pricing pressure on products and services, which could decrease our revenues and have an adverse effect on our financial condition and cash flows. In addition, during periods of economic uncertainty, our customers may temporarily pursue inventory reduction measures that exceed declines in the actual underlying demand. Our businesses are sensitive to industry capacity utilization, particularly Reinforcement Materials and Purification Solutions. As a result, pricing tends to fluctuate when capacity utilization changes occur, which could affect our financial performance.

In addition, current tensions in the U.S.-China trade relationship have led to the implementation by both countries of higher tariffs on imported goods from the other. If there is no satisfactory progress on trade negotiations between the countries, there could be adverse implications on our businesses and operating results in both the U.S. and China if, as a result, we encounter unexpected operating difficulties in China, more restrictive investment opportunities in China, greater difficulty transferring funds, or negative currency impacts. Further, the cost of our capital projects may be higher than anticipated because of these trade tariffs.

As the U.K. has committed to a withdrawal from the EU, the future structure of trade between the U.K. and the rest of Europe is uncertain. We have production facilities within the U.K. that supply customers in the EU and customers within the U.K. that are supplied by production facilities in the EU and any future tariffs or other disruptions to these trade flows could negatively impact our business.

As a chemical manufacturing company, our operations are subject to operational risks and have the potential to cause environmental or other damage as well as personal injury, which could adversely affect our business, results of operations and cash flows.

The operation of a chemical manufacturing business as well as the sale and distribution of chemical products are subject to operational as well as safety, health and environmental risks. For example, the production and/or processing of carbon black, specialty compounds, fumed metal oxides, aerogel, activated carbon and other chemicals involve the handling, transportation, manufacture or use of certain substances or components that may be considered toxic or hazardous. Our manufacturing processes and the transportation of our chemical products and/or the raw materials used to manufacture our products are subject to risks inherent in chemical manufacturing, including leaks, fires, explosions, toxic releases, mechanical failures or unscheduled downtime. If operational risks materialize, they could result in injury or loss of life, damage to the environment, or damage to property. In addition, the occurrence of material operating problems at our facilities or a disruption in our supply chain or distribution operations may result in loss of production, which, in turn, may make it difficult for us to meet customer needs. Accordingly, these events and their consequences could negatively impact the Company’s results of operations and cash flows, both during and after the period of operational difficulties, and could harm our reputation.

A significant adverse change in a customer relationship or the failure of a customer to perform its obligations under agreements with us could harm our business or cash flows.

Our success in strengthening relationships and growing business with our largest customers and retaining their business over extended time periods is important to our future results. We have a group of key customers across our businesses that together represent a significant portion of our total net sales and operating revenues. The loss of any of our important customers, or a significant reduction in volumes sold to them, could adversely affect our results of operations until such business is replaced or any temporary disruption ends. Further, in our Reinforcement Materials segment we enter into supply arrangements with a number of key customers, that have a duration of at least one year, which account for approximately half of our total rubber blacks volumes. Our success in negotiating the price and volume terms under these arrangements could have a material effect on our results. In addition, any deterioration in the financial condition of any of our customers that impairs our customers’ ability to make payments to us also could increase our uncollectible receivables and could affect our future results and financial condition.

Volatility in the price and availability of raw materials and energy could impact our margins and working capital.

Our manufacturing processes consume significant amounts of energy and raw materials, the costs of which are subject to worldwide supply and demand as well as other factors beyond our control. Our carbon black businesses use a variety of feedstocks as raw material including high sulfur fuel oils, low sulfur fuel oils, coal tar distillates, and ethylene cracker residue, the cost and availability of which vary, based in part on geography. Significant movements or volatility in our carbon black feedstock costs could have an adverse effect on our working capital and results of operations. In addition, regulatory changes may impact the prices of our feedstocks. For example, the International

Maritime Organization regulation known as MARPOL will restrict the type of marine fuels that can be used for the shipping industry beginning January 1, 2020, which may impact the prices and availability of the feedstocks we purchase. Certain of our carbon black supply arrangements contain provisions that adjust prices to account for changes in relevant feedstock and natural gas price indices. We also attempt to offset the effects of increases in raw material and energy costs through selling price increases in our non-contract sales, productivity improvements and cost reduction efforts. Success in offsetting increased raw material and energy costs with price increases is largely influenced by competitive and economic conditions and could vary significantly depending on the segment served. Such increases may not be accepted by our customers, may not be sufficient to compensate for increased raw material and energy costs or may decrease demand for our products and our volume of sales. If we are not able to fully offset the effects of increased raw material or energy costs, it could have a significant impact on our financial results. Rapid declines in energy and raw material costs can also negatively impact our financial results, as such changes can negatively affect the returns we receive on our energy centers and yield improvement investments, and may negatively impact our contract pricing adjustments. In addition, we use a variety of feedstock indices in our supply arrangements to adjust our prices for changes in raw materials costs. Depending on feedstock markets and our choice of feedstocks, the indices we use in our supply arrangements may not precisely track our actual costs. This could result in an incongruity between our pricing adjustments and changes in our actual feedstock costs, which can affect our margins.

In addition, we obtain certain of our raw materials from selected key suppliers. Although we maintain raw material inventory, if any of these suppliers is unable to meet its obligations under supply agreements with us on a timely basis or at all, we may be forced to incur higher costs to obtain the necessary raw materials elsewhere or, in certain limited cases, may not be able to obtain the required raw materials.

We may not be successful achieving our growth expectations from new products, new applications and technology developments, and money we spend on these efforts may not result in a proportional increase in our revenues or profits.

We may not be successful achieving our growth expectations from developing new products or product applications. Moreover, we cannot be certain that the costs we incur investing in new product and technology development will result in a proportional increase in our revenues or profits. In addition, the timely commercialization of products that we are developing may be disrupted or delayed by manufacturing or other technical difficulties, market acceptance or insufficient market size to support a new product, competitors' new products, and difficulties in moving from the experimental stage to the production stage. These disruptions or delays could affect our future business results.

Information technology systems failures, data security breaches or network disruptions could compromise our information, disrupt our operations and expose us to liability, which may adversely impact our operations.

In the ordinary course of our business, we store sensitive data, including intellectual property, our proprietary business information and certain information of our customers, suppliers, business partners, and employees in our information technology systems. The secure processing, maintenance and transmission of this data is critical to our operations. Information technology systems failures, including risks associated with upgrading our systems or in successfully integrating information technology and other systems in connection with the integration of businesses we acquire, network disruptions or unauthorized access could disrupt our operations by impeding our processing of transactions and our financial reporting, and our ability to protect our customer or company information, which could have a material adverse effect on our business or results of operations. In addition, as with all enterprise information systems, our information technology systems could be penetrated by outside parties intent on extracting information, corrupting information, or disrupting business processes. Breaches of our security measures or the accidental loss, inadvertent disclosure, or unapproved dissemination of proprietary information or sensitive or confidential information about the Company, our employees, our vendors, or our customers, could result in legal claims or proceedings and potential liability for us, and damage to our reputation, and could otherwise harm our business and our results of operations.

Any failure to realize benefits from acquisitions, alliances or joint ventures could adversely affect future financial results.

In achieving our strategic plan objectives, we may pursue acquisitions, alliances or joint ventures intended to complement or expand our existing businesses globally or add product technology, or both. The success of acquisitions of businesses, new technologies and products, or arrangements with third parties is not always predictable and we may not be successful in realizing our objectives as anticipated. We may not be able to integrate any acquired businesses successfully into our existing businesses, make such businesses profitable, or realize anticipated cost savings or synergies, if any, from these acquisitions, which could adversely affect our business results.

Plant capacity expansions and site development projects may impact existing plant operations, be delayed and/or not achieve the expected benefits.

Our ability to complete capacity expansions and site development projects as planned may be delayed or interrupted by the need to obtain environmental and other regulatory approvals, unexpected cost increases, availability of labor and materials, unforeseen hazards such as weather conditions, and other risks customarily associated with construction projects. These risks include the risk that existing plant operations are disrupted, which could make it difficult for us to meet our customer needs. Moreover, in the case of capacity expansions, the cost of these activities could have a negative impact on the financial performance of the relevant business until capacity utilization at the particular facility is sufficient to absorb the incremental costs associated with an expansion. In addition, our ability to expand capacity in emerging regions depends in part on economic and political conditions in these regions and, in some cases, on our ability to establish operations, construct additional manufacturing capacity or form strategic business alliances.

An interruption in our operations as a result of fence-line arrangements could disrupt our manufacturing operations and adversely affect our financial results.

At certain of our facilities we have fence-line arrangements with adjacent third party manufacturing operations ("fence-line partners"), who provide raw materials for our manufacturing operations and/or take by-products generated from our operations. Accordingly, any disruptions or curtailments in a fence-line partner's production facilities that impacts their ability to supply us with raw materials or to take our manufacturing by-products could disrupt our manufacturing operations or cause us to incur increased operating costs to mitigate such disruption.

We are exposed to political or country risk inherent in doing business in some countries.

Sales outside of the U.S. constituted a majority of our revenues in fiscal 2018. We conduct business in several countries that have less stable legal systems and financial markets, and potentially more corrupt business environments than the U.S. Our operations in some countries are subject to the following risks: changes in the rate of economic growth; unsettled political or economic conditions; non-renewal of operating permits or licenses; possible expropriation or other governmental actions; corruption by government officials and other third parties; social unrest, war, terrorist activities or other armed conflict; confiscatory taxation or other adverse tax policies; deprivation of contract rights; trade regulations affecting production, pricing and marketing of products; reduced protection of intellectual property rights; restrictions or additional costs associated with repatriating cash; exchange controls; inflation; currency fluctuations and devaluation; the effect of global health, safety and environmental matters on economic conditions and market opportunities; and changes in financial policy and availability of credit.

The Chinese government has, from time to time, curtailed manufacturing operations, without notice, in industrial regions out of growing concern over air quality. The timing and length of these curtailments are difficult to predict and, at times, are applied to manufacturing operations without regard to whether the operations being curtailed comply with environmental regulations in the area. Accordingly, although we believe our operations are in compliance with applicable regulations, our manufacturing operations in China may be subject to these curtailments. These events could negatively impact the Company’s results of operations and cash flows both during and after the period of any curtailment affecting the Company’s operations.

We face competition from other specialty chemical companies.

We operate in a highly competitive marketplace. Our ability to compete successfully depends in part upon our ability to maintain a superior technological capability and to continue to identify, develop and commercialize new and innovative, high value-added products for existing and future customers. Increased competition from existing or newly developed products offered by our competitors or companies whose products offer a similar functionality as our products and could be substituted for our products, may negatively affect demand for our products. In addition, actions by our competitors could impair our ability to maintain or raise prices, successfully enter new markets or maintain or grow our market position.

Litigation or legal proceedings could expose us to significant liabilities and thus negatively affect our financial results.

As more fully described in “Legal Proceedings” in Item 3 below, we are a party to or the subject of lawsuits, claims, and proceedings, including, but not limited to, those involving environmental, and health and safety matters as well as product liability and personal injury claims relating to asbestosis, silicosis, and coal worker’s pneumoconiosis. We are also a potentially responsible party in various environmental proceedings and remediation matters wherein substantial amounts are at issue. Adverse rulings, judgments or settlements in pending or future litigation (including liabilities associated with respirator claims) or in connection with environmental remediation activities could adversely affect our financial results or cause our results to differ materially from those expressed or forecasted in any forward-looking statements.

Fluctuations in foreign currency exchange and interest rates affect our financial results.

We earn revenues, pay expenses, own assets and incur liabilities in countries using currencies other than the U.S. dollar. In fiscal 2018, we derived a majority of our revenues from sales outside the U.S. Because our consolidated financial statements are presented in U.S. dollars, we must translate revenues and expenses, as well as assets and liabilities, into U.S. dollars at exchange rates in effect during or at the end of each reporting period. Therefore, increases or decreases in the value of the U.S. dollar against other currencies in countries where we operate will affect our results of operations and the value of balance sheet items denominated in foreign currencies. Due to the geographic diversity of our operations, weaknesses in some currencies might be offset by strengths in others over time. In addition, we are exposed to adverse changes in interest rates. We manage both these risks through normal operating and financing activities and, when deemed appropriate, through the use of derivative instruments as well as foreign currency debt. We cannot be certain, however, that we will be successful in reducing the risks inherent in exposures to foreign currency and interest rate fluctuations.

Further, we have exposure to foreign currency movements because certain foreign currency transactions need to be converted to a different currency for settlement. These conversions can have a direct impact on our cash flows.

Our tax rate is dependent upon a number of factors, a change in any of which could impact our future tax rates and net income.

Our future tax rates may be adversely affected by a number of factors, including: future changes in the jurisdictions in which our profits are determined to be earned and taxed; changes in the estimated realization of our net deferred tax assets; the repatriation of non-U.S. earnings for which we have not previously provided for non-U.S. withholding taxes; adjustments to estimated taxes upon finalization of various tax returns; increases in expenses that are not deductible for tax purposes; changes in available tax credits; the resolution of issues arising from tax audits with various tax authorities; and changes in tax laws or the interpretation of such tax laws. Losses for which no tax benefits can be recorded could materially impact our tax rate and its volatility from one quarter to another.

We face operational risks inherent in mining operations and our mining operations have the potential to cause safety issues, including those that could result in significant personal injury.

We own two mines, a cesium mine in Manitoba, Canada, a portion of which is located under Bernic Lake, and an above-ground lignite mine, which is located close to our Marshall, Texas facility and operated by a subsidiary of The North American Coal Company. Mining operations by their nature involve a high level of uncertainty and are often affected by risks and hazards outside of our control. At our lignite mine, the risks are primarily operational risks associated with the maintenance and operation of the heavy equipment required to dig and haul the lignite, and risks relating to lower than expected lignite quality or recovery rates. Our underground mine in Manitoba is subject to a number of risks, including industrial accidents, unexpected geological conditions, fall of ground accidents or structural collapses, which, in the case of our cesium mine, could lead to flooding. Following a fall of ground incident in 2013, we implemented additional safety measures and several types of monitoring devices in the mine that have indicated good structural stability in the mine since that time. However, the structural stability may change at any time and there remains a possibility of deterioration and flooding of this mine. The failure to adequately manage these risks could result in significant personal injury, loss of life, damage to mineral properties, production facilities or mining equipment, damage to the environment, delays in or reduced production, and potential legal liabilities.

Our operations and products are subject to extensive safety, health and environmental requirements, which could increase our costs and/or impair our ability to manufacture and sell certain products.

Our ongoing operations are subject to extensive federal, state, local and foreign laws, regulations, rules and ordinances relating to safety, health and environmental matters, many of which provide for substantial monetary fines and criminal sanctions for violations. These include requirements to obtain and comply with various environmental-related permits for constructing any new facilities and operating all of our existing facilities. In addition, in certain geographic areas, our carbon black and activated carbon facilities are or may become subject to greenhouse gas emission trading schemes under which we may be required to purchase emission credits if our emission levels exceed our allocations. Greenhouse gas regulatory programs that have been adopted, such as cap-and-trade programs, have not had a significant impact on our businesses to date. Costs of complying with regulations could increase as concerns related to greenhouse gases and climate change continue to emerge. The enactment of new environmental laws and regulations and/or the more aggressive interpretation of existing requirements could require us to incur significant costs for compliance or capital improvements or limit our current or planned operations, any of which could have a material adverse effect on our earnings or cash flow. We attempt to offset the effects of these compliance costs through price increases, productivity improvements and cost reduction efforts. Success in offsetting any such increased regulatory costs is largely influenced by competitive and economic conditions and could vary significantly depending on the segment served. Such increases may not be accepted by our customers, may not be sufficient to compensate for increased regulatory costs or may decrease demand for our products and our volume of sales. (See “Legal Proceedings” in Item 3 below).

In order to secure and maintain the right to produce or sell our products, we must satisfy product related regulatory requirements in different jurisdictions. Obtaining and maintaining these approvals requires a significant amount of product testing and data, and there is no certainty these approvals will be obtained.

Certain national and international health organizations have classified carbon black as a possible or suspected human carcinogen. To the extent that, in the future, (i) these organizations re-classify carbon black as a known or confirmed carcinogen, (ii) other organizations or government authorities in other jurisdictions classify carbon black or any of our other finished products, raw materials or intermediates as suspected or known carcinogens or otherwise hazardous, or (iii) there is discovery of adverse health effects attributable to production or use of carbon black or any of our other finished products, raw materials or intermediates, we could be required to incur significantly higher costs to comply with environmental, health and safety laws, or to comply with restrictions on sales of our products, be subject to legal claims, and our reputation and business could be adversely affected. In addition, chemicals that are currently classified as non-hazardous may be classified as hazardous in the future, and our products may have characteristics that are not recognized today but may be found in the future to impair human health or to be carcinogenic.

Action by the U.S. Environmental Protection Agency (“EPA”) related to its Mercury and Air Toxics Standards (“MATS”) that decreases demand for our mercury removal products, and/or the failure of tariffs placed on U.S. imports of Chinese activated carbon to adequately address the impact of low-priced imports from China, could have a material adverse effect on our Purification Solutions segment.

Growth in the environmental portion of our Purification Solutions business depends on stable demand in the mercury removal related portion of the business, which is largely dependent on the amount of coal-based power generation used in the U.S. and the continued regulation of utilities under MATS. In August 2018, the EPA announced that it intends to reconsider the MATS rule and in September submitted its proposal to the White House Office of Management and Budget. Any action that the EPA takes related to MATS that decreases demand for our products for mercury removal will have a negative effect on the financial results of the Purification Solutions segment.

In addition, Purification Solutions faces competition in the U.S. from low-priced imports of activated carbon products. If the amounts of these low-priced imports increase, especially if they are sold at less than fair value, our sales of competing products could decline, which could have an adverse effect on the earnings of Purification Solutions. In addition, sales of these low-priced imports may negatively impact our pricing. To limit these activities, regulators in the U.S. have enacted an antidumping duty order on steam activated carbon products from China. In fiscal 2018, the order was extended for an additional five years. The amount of antidumping duties collected on imports of steam activated carbon from China is reviewed annually by the U.S. Department of Commerce. To the extent the antidumping margins do not adequately address the degree to which imports are unfairly traded, the antidumping order may be less effective in reducing the volume of these low-priced activated carbon imports in the U.S., which could negatively affect demand and/or pricing for our products.

We have entered into a number of derivative contracts with financial counterparties. The effectiveness of these contracts is dependent on the ability of these financial counterparties to perform their obligations and their nonperformance could harm our financial condition.

We have entered into forward foreign currency contracts and cross-currency swaps as part of our financial risk management strategy. The effectiveness of our risk management program using these instruments is dependent, in part, upon the counterparties to these contracts honoring their financial obligations. If any of our counterparties are unable to perform their obligations in the future, we could be exposed to increased earnings and cash flow volatility due to an instrument’s failure to hedge or adequately address a financial risk.

The continued protection of our patents, trade secrets and other proprietary intellectual property rights are important to our success.

Our patents, trade secrets and other intellectual property rights are important to our success and competitive position. We own various patents and other intellectual property rights in the U.S. and other countries covering many of our products, as well as processes and product uses. Where we believe patent protection is not appropriate or obtainable, we rely on trade secret laws and practices to protect our proprietary technology and processes, such as physical security, limited dissemination and access and confidentiality agreements with our employees, customers, consultants, business partners, potential licensees and others to protect our trade secrets and other proprietary information. However, trade secrets can be difficult to protect and the protective measures we have put in place may not prevent disclosure or unauthorized use of our proprietary information or provide an adequate remedy in the event of misappropriation or other violations of our proprietary rights. In addition, we are a licensee of various patents and intellectual property rights belonging to others in the U.S. and other countries. Because the laws and enforcement mechanisms of some countries may not allow us to protect our proprietary rights to the same extent as we are able to do in the U.S., the strength of our intellectual property rights will vary from country to country.

Irrespective of our proprietary intellectual property rights, we may be subject to claims that our products, processes or product uses infringe the intellectual property rights of others. These claims, even if they are without merit, could be expensive and time consuming to defend and if we were to lose such claims, we could be enjoined from selling our products or using our processes and/or be subject to damages, or be required to enter into licensing agreements requiring royalty payments and/or use restrictions. Licensing agreements may not be available to us, or if available, may not be available on acceptable terms.

Natural disasters could affect our operations and financial results.

We operate facilities in areas of the world that are exposed to natural hazards, such as floods, windstorms, hurricanes, and earthquakes. Extreme weather events present physical risks that may become more frequent as a result of factors related to climate change. Such events could disrupt our supply of raw materials or otherwise affect production, transportation and delivery of our products or affect demand for our products.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Cabot's corporate headquarters are in leased office space in Boston, Massachusetts. We also own or lease office, manufacturing, storage, distribution, marketing and research and development facilities in the U.S. and in foreign countries. The locations of our principal manufacturing and/or administrative facilities are set forth in the table below. Unless otherwise indicated, all the properties are owned.

Location by Region	Reinforcement Materials	Performance Chemicals	Purification Solutions	Specialty Fluids
Americas Region				
Alpharetta, Georgia*(1)	X	X	X	X
Tuscola, Illinois		X		
Canal, Louisiana	X	X		
Ville Platte, Louisiana	X			
Billerica, Massachusetts	X	X	X	X
Haverhill, Massachusetts		X		
Midland, Michigan		X		
Pryor, Oklahoma			X	
Marshall, Texas			X	
Pampa, Texas	X	X		
Campana, Argentina	X			
Maua, Brazil	X	X		
Sao Paulo, Brazil*(1)	X	X	X	X
Lac du Bonnet, Manitoba, Canada**				X
Saint-Jean-sur-Richelieu, Québec, Canada		X		
Sarnia, Ontario, Canada	X	X		
Cartagena, Colombia	X			
Altamira, Mexico	X			
Europe, Middle East and Africa Region				
Loncin, Belgium		X		
Pepinster, Belgium		X		
Valasske Mezirici (Valmez), Czech Republic**	X			
Port Jerome, France**	X			
Frankfurt, Germany*		X		
Rheinfelden, Germany		X		
Ravenna, Italy (2 plants)	X		X	
Riga, Latvia*(1)	X	X	X	X
Bergen, Norway*				X
Schaffhausen, Switzerland*	X	X	X	X
Botlek, Netherlands**	X	X		
Amersfoort, Netherlands*			X	
Klazienaveen, Netherlands			X	
Zaandam, Netherlands			X	
Dubai, United Arab Emirates*		X		
Purton, United Kingdom (England)			X	
Aberdeen, United Kingdom (Scotland)*				X
Glasgow, United Kingdom (Scotland)			X	
Barry, United Kingdom (Wales)**		X		

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Location by Region	Reinforcement Materials	Performance Chemicals	Purification Solutions	Specialty Fluids
Asia Pacific Region				
Jiangsu Province, China**		X		
Jiangxi Province, China**		X		
Tianjin, China**	X	X		
Shanghai, China*(1)	X	X	X	X
Shanghai, China** (plant)	X			
Xingtai City, China**	X			
Mumbai, India*	X	X	X	
Cilegon, Indonesia**	X			
Jakarta, Indonesia*(1)	X	X	X	X
Chiba, Japan	X			
Shimonoseki, Japan**	X			
Tokyo, Japan*(1)	X	X	X	X
Port Dickson, Malaysia**	X			

(1) Business service center
*Leased premises
**Building(s) owned by Cabot on leased land

We conduct research and development for our various businesses primarily at facilities in Billerica, Massachusetts; Amersfoort, Netherlands; Pampa, Texas; Pepinster, Belgium; Frankfurt, Germany; and Shanghai, China.

With our existing manufacturing plants and planned expansions, we generally have sufficient production capacity to meet current requirements and expected near-term growth. These plants are generally well maintained, in good operating condition and suitable and adequate for their intended use. Our administrative offices and other facilities are suitable and adequate for their intended purposes.

Item 3. Legal Proceedings

Cabot is a party in various lawsuits and environmental proceedings wherein substantial amounts are claimed. The following is a description of the significant proceedings pending on September 30, 2018, unless otherwise specified.

Environmental Proceedings

In November 2013, Cabot entered into a Consent Decree with the EPA and the Louisiana Department of Environmental Quality ("LDEQ") regarding Cabot's three carbon black manufacturing facilities in the U.S. This settlement is related to the EPA's national enforcement initiative focused on the U.S. carbon black manufacturing sector alleging non-compliance with certain regulatory and permitting requirements under The Clean Air Act, including the New Source Review ("NSR") construction permitting requirements. Pursuant to this settlement, Cabot is in the process of installing technology controls for sulfur dioxide and nitrogen oxide. We expect that the total capital costs to install these controls will be between $100 million and $150 million and will be incurred through calendar year 2022. All carbon black manufacturers have settled with the EPA and will be installing similar technology controls.

We continue to perform certain sampling and remediation activities at a former pine tar manufacturing site in Gainesville, Florida that we sold in the 1960s. Those activities are pursuant to a formal Record of Decision and 1991 Consent Decree with the EPA under which we installed a groundwater treatment system at the site in the early 1990s, which remains in operation. More recently, we have been requested by the EPA and other stakeholders to carry out various other additional work at the site, the scope of which has yet to be fully determined. We continue to work cooperatively with the EPA, the Florida Department of Environmental Protection and the local authorities on this matter.

As of September 30, 2018, we had a $15 million reserve for environmental remediation costs at various sites. The operation and maintenance component of this reserve was $3 million. The $15 million reserve represents our current best estimate of costs likely to be incurred for remediation based on our analysis of the extent of cleanup required, alternative cleanup methods available, the ability of other responsible parties to contribute and our interpretation of laws and regulations applicable to each of our sites.

Other Proceedings

Respirator Liabilities

We have exposure in connection with a safety respiratory products business that a subsidiary acquired from American Optical Corporation ("AO") in an April 1990 asset purchase transaction. The subsidiary manufactured respirators under the AO brand and disposed of that business in July 1995. In connection with its acquisition of the business, the subsidiary agreed, in certain circumstances, to assume a portion of AO's liabilities, including costs of legal fees together with amounts paid in settlements and judgments, allocable to AO respiratory products used prior to the 1990 purchase by the Cabot subsidiary. In exchange for the subsidiary's assumption of certain of AO's respirator liabilities, AO agreed to provide to the subsidiary the benefits of: (i) AO's insurance coverage for the period prior to the 1990 acquisition and (ii) a former owner's indemnity of AO holding it harmless from any liability allocable to AO respiratory products used prior to May 1982.

Generally, these respirator liabilities involve claims for personal injury, including asbestosis, silicosis and coal worker's pneumoconiosis, allegedly resulting from the use of respirators that are alleged to have been negligently designed and/or labeled. Neither Cabot, nor its past or present subsidiaries, at any time manufactured asbestos or asbestos-containing products. At no time did this respiratory product line represent a significant portion of the respirator market.

The subsidiary transferred the business to Aearo Corporation ("Aearo") in July 1995. Cabot agreed to have the subsidiary retain certain liabilities associated with exposure to asbestos and silica while using respirators prior to the 1995 transaction so long as Aearo paid, and continues to pay, Cabot an annual fee of $400,000. Aearo can discontinue payment of the fee at any time, in which case it will assume the responsibility for and indemnify Cabot against those liabilities which Cabot's subsidiary had agreed to retain. We anticipate that we will continue to receive payment of the $400,000 fee from Aearo and thereby retain these liabilities for the foreseeable future. We have no liability in connection with any products manufactured by Aearo after 1995.

In addition to Cabot's subsidiary and as described above, other parties are responsible for significant portions of the costs of respirator liabilities, leaving Cabot's subsidiary with a portion of the liability in only some of the pending cases. These parties include Aearo, AO, AO's insurers, another former owner and its insurers, and a third-party manufacturer of respirators formerly sold under the AO brand and its insurers (collectively, with Cabot's subsidiary, the "Payor Group").

As of September 30, 2018 and 2017, there were approximately 35,000 and 37,000 claimants, respectively, in pending cases asserting claims against AO in connection with respiratory products. Cabot has contributed to the Payor Group's defense and settlement costs with respect to a percentage of pending claims depending on several factors, including the period of alleged product use. In order to quantify our estimated share of liability for pending and future respirator liability claims, we have engaged, through counsel, the assistance of Nathan Associates, Inc. ("Nathan"), a leading consulting firm in the field of tort liability valuation. The methodology used by Nathan addresses the complexities surrounding our potential liability by making assumptions about future claimants with respect to periods of asbestos, silica and coal mine dust exposure and respirator use. Using those and other assumptions, Nathan estimates the number of future asbestos, silica and coal mine dust claims that will be filed and the related costs that would be incurred in resolving both currently pending and future claims. On this basis, Nathan then estimates the value of the share of these liabilities that reflect our period of direct manufacture and our contractual obligations. During the three months ended September 30, 2018, Nathan updated this estimate. Based on the Nathan estimates, as of September 30, 2018, we increased our reserve for our estimated share of the liability for pending and future respirator claims by $10 million to $25 million. The increase reflects higher costs of defending and resolving these claims. We made payments related to our respirator liability of $3 million in each of fiscal 2018, fiscal 2017 and fiscal 2016.

Our current estimate of the cost of our share of existing and future respirator liability claims is based on facts and circumstances existing at this time. Developments that could affect our estimate include, but are not limited to, (i) significant changes in the number of future claims, (ii) changes in the rate of dismissals without payment of pending claims, (iii) significant changes in the average cost of resolving claims, (iv) significant changes in the legal costs of defending these claims, (v) changes in the nature of claims received, (vi) changes in the law and procedure applicable to these claims, (vii) the financial viability of members of the Payor Group, (viii) a change in the availability of the insurance coverage of the members of the Payor Group or the indemnity provided by AO's former owner, (ix) changes in the allocation of costs among the Payor Group, and (x) a determination that the assumptions that were used to estimate our share of liability are no longer reasonable. We cannot determine the impact of these potential developments on our current estimate of our share of liability for these existing and future claims. Accordingly, the actual amount of these liabilities for existing and future claims could be different than the reserved amount.

Other Matters

We have various other lawsuits, claims and contingent liabilities arising in the ordinary course of our business and with respect to our divested businesses. We do not believe that any of these matters will have a material adverse effect on our financial position; however, litigation is inherently unpredictable. We could incur judgments, enter into settlements or revise our expectations regarding the outcome of certain matters, and such developments could have a material impact on our results of operations in the period in which the amounts are accrued or our cash flows in the period in which the amounts are paid.

Item 4. Mine Safety Disclosures

Not applicable.

Executive Officers of the Registrant

Set forth below is certain information about Cabot's executive officers as of November 21, 2018.

Sean D. Keohane, age 51, is President and Chief Executive Officer and a member of Cabot's Board of Directors, positions he has held since March 2016. Mr. Keohane joined Cabot in 2002. From November 2014 until March 2016 he was Executive Vice President and President of Reinforcement Materials. From March 2012 until November 2014, he was Senior Vice President and President of Performance Chemicals, and from May 2008 until March 2012, he was General Manager of Performance Chemicals. He was appointed Vice President in March 2005, Senior Vice President in March 2012 and Executive Vice President in November 2014. He was a member of the Interim Office of the Chief

Executive Officer (the “CEO Office”), which was in place from December 2015 until March 2016.

Erica J. McLaughlin, age 42, is Senior Vice President and Chief Financial Officer. Ms. McLaughlin joined Cabot in 2002, and was appointed Senior Vice President and Chief Financial Officer in May 2018. From June 2016 until May 2018 she was Vice President of Business Operations for Reinforcement Materials and General Manager of the tire business, and from July 2011 until June 2016, she was Vice President of Investor Relations and Corporate Communications. Prior to July 2011, she held a variety of leadership positions in Finance and Corporate Planning. Ms. McLaughlin assumed interim responsibility for Corporate Strategy and Development in October 2018.

Brian A. Berube, age 56, is Senior Vice President and General Counsel. Mr. Berube joined Cabot in 1994. He was appointed General Counsel in March 2003. He was Business General Counsel from March 2002 to March 2003, Deputy General Counsel from June 2001 to March 2002, and an attorney in Cabot’s law department from 1994 until June 2001. In addition, he was interim Chief Human Resources Officer from July 2016 until March 2017. Mr. Berube was appointed Vice President in March 2002 and Senior Vice President in March 2012. He was a member of the CEO Office, which was in place from December 2015 until March 2016.

John R. Doubman, age 47, is Senior Vice President, and, effective October 1, 2018, President of Performance Additives, Performance Chemicals. Mr. Doubman joined Cabot in 2006. Prior to assuming his current position in October 2018, he was Senior Vice President, Corporate Strategy and Development from April 2016 until September 2018 and President of Specialty Fluids from January 2017 until September 2018, Vice President and General Manager of the tire business from April 2015 until April 2016, Vice President Global Business Operation and Strategy, Reinforcement Materials from August 2014 until April 2015, and General Manager for the rubber blacks business in the Europe, Middle East and Africa region from February 2010 until August 2014. In addition, Mr. Doubman was Vice President and General Manager of the elastomer composites business from January 2013 until March 2016. Prior to 2010, he held a variety of leadership positions in Reinforcement Materials and Corporate Strategy.

Hobart C. Kalkstein, age 48, is Senior Vice President and President of Reinforcement Materials. Mr. Kalkstein joined Cabot in 2005. Prior to assuming his current role in April 2016, he was Vice President of Corporate Strategy and Development from December 2015 to April 2016. From October 2013 to December 2015, he served as Vice President of Global Business Operations for Purification Solutions and from November 2012 to December 2015 as General Manager of Global Emission Control Solutions for Purification Solutions, and from January 2012 to November 2012 he served as Vice President of Business Operations and Executive Director of Marketing and Business Strategy for Performance Chemicals. Prior to that, he served as General Manager of the Aerogel business from October 2007 to February 2010.

Friedrich von Gottberg, age 50, is Senior Vice President and President of Purification Solutions. Mr. von Gottberg joined Cabot in 1997. Prior to assuming his current role in January 2013, he was Senior Vice President and President of Advanced Technologies from March 2012 until January 2013, and Vice President of the New Business Group from March 2008 until March 2012. In addition, he was interim Chief Technology Officer from May 2017 until February 2018. Prior to 2008, Mr. von Gottberg held a variety of leadership positions in Research and Development and Finance. He was appointed Vice President in March 2005 and Senior Vice President in March 2012.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Cabot's common stock is listed for trading (symbol CBT) on the New York Stock Exchange. As of November 15, 2018, there were 662 holders of record of Cabot's common stock.

Issuer Purchases of Equity Securities

The table below sets forth information regarding Cabot's purchases of its equity securities during the quarter ended September 30, 2018:

Period	Total Number of Shares Purchased[(1)]	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs[(1)]	Maximum Number (or Approximate Dollar Value) of Shares that May Yet Be Purchased Under the Plans or Programs[(1)]
July 1, 2018 — July 31, 2018	—	$ —	—	10,828,198
August 1, 2018 — August 31, 2018	630,000	$ 65.02	630,000	10,198,198
September 1, 2018 — September 30, 2018	665,000	$ 63.95	665,000	9,533,198
Total	1,295,000		1,295,000	

(1) On July 13, 2018, Cabot publicly announced that the Board of Directors authorized the Company to repurchase up to an additional ten million shares of its common stock on the open market or in privately negotiated transactions, increasing the current balance of shares available for repurchase at that time to approximately eleven million shares. The current authorization does not have a set expiration date.

Item 6. Selected Financial Data

On November 18, 2013, Cabot purchased all of its joint venture partner's common stock in NHUMO, S.A. de C.V. ("NHUMO"), which represented approximately 60% of the outstanding common stock of the joint venture. Prior to this transaction, the Company owned approximately 40% of the outstanding common stock of NHUMO, and the NHUMO entity was accounted for as an equity affiliate of the Company. The results of fiscal 2014 in the table below include 11 months of results at 100% consolidation and one month of results accounted for under the equity method at 40%.

The Company completed the sale of its Security Materials business on July 31, 2014. The results of operations for this business for all periods presented are reflected as discontinued operations in the Consolidated Statements of Operations.

	Years Ended September 30				
	2018	2017	2016	2015	2014
	(In millions, except per share amounts and ratios)				
Consolidated Net Income (Loss)					
Net sales and other operating revenues	$3,242	$2,717	$2,411	$2,871	$3,647
Gross profit[1]	781	663	575	585	721
Selling and administrative expenses	305	260	275	282	326
Research and technical expenses	66	56	53	58	60
Purification Solutions long-lived assets impairment charge	162	—	—	210	—
Purification Solutions goodwill impairment charge	92	—	—	352	—
Income (loss) from operations	156	347	247	(317)	335
Net interest expense and other charges[2]	(39)	(48)	(56)	(60)	(27)
Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies[1][3]	117	299	191	(377)	308
(Provision) benefit for income taxes[1][4]	(193)	(33)	(33)	45	(92)
Equity in earnings of affiliated companies	2	7	3	4	—
Income (loss) from discontinued operations, net of tax	—	—	1	2	2
Net income (loss)[1]	(74)	273	162	(326)	218
Net income attributable to noncontrolling interests, net of tax	39	25	15	8	19
Net income (loss) attributable to Cabot Corporation[1]	$(113)	$248	$147	$(334)	$199
Common Share Data					
Diluted net income (loss) attributable to Cabot Corporation:					
Income (loss) from continuing operations[1]	$(1.85)	$3.91	$2.30	$(5.29)	$3.01
Income (loss) from discontinued operations	—	—	0.02	0.02	0.02
Net income (loss) attributable to Cabot Corporation	$(1.85)	$3.91	$2.32	$(5.27)	$3.03
Dividends	$1.29	$1.23	$1.04	$0.88	$0.84
Closing prices	$62.72	$55.80	$52.41	$31.56	$50.77
Weighted-average diluted shares outstanding—millions	61.7	62.7	62.9	63.4	65.1
Shares outstanding at year end—millions	60.4	61.9	62.2	62.5	64.4
Consolidated Financial Position					
Current assets[1][5]	$1,386	$1,299	$1,073	$1,004	$1,364
Net property, plant, and equipment	1,296	1,305	1,290	1,383	1,581
Other assets[1][5]	562	734	689	676	1,139
Total assets	$3,244	$3,338	$3,052	$3,063	$4,084
Current liabilities[5]	$952	$742	$397	$440	$630
Long-term debt[5]	719	661	914	967	1,004
Other long-term liabilities[5]	294	310	352	318	386
Cabot Corporation stockholders’ equity[1]	1,154	1,504	1,291	1,234	1,942
Noncontrolling interests	125	121	98	104	122
Total liabilities and stockholders’ equity	$3,244	$3,338	$3,052	$3,063	$4,084
Selected Financial Ratios					
Net debt to capitalization ratio[1][6]	39 %	28 %	34 %	41 %	33 %

Adjusted return on net assets(7)	14	%	13	%	11	%	9	%	10	%

(1) In fiscal 2018, the Company elected to change its inventory valuation method of accounting for its U.S. carbon black inventories from the last-in, first-out ("LIFO") method to the first-in, first-out ("FIFO") method. The Company applied this change retrospectively and fiscal 2017 and 2016 balances have been updated as discussed in Note A of our Notes to the Consolidated Financial Statements ("Note A"). Fiscal 2015 and 2014 have not been updated to reflect this change and may not be comparable to the other years presented.

(2) Net interest expense and other charges includes foreign currency activity as follows: a loss of $4 million for both fiscal 2018 and fiscal 2017, a gain of $5 million for fiscal 2016, a loss of $8 million for fiscal 2015, and a loss of $2 million for fiscal 2014.

(3) Income (loss) from continuing operations includes certain items as presented in the table below. A discussion of certain items is included in Definition of Terms and Non-GAAP Financial Measures in Results of Operations.

	Years Ended September 30				
	2018	2017	2016	2015	2014
	(In millions)				
Global restructuring activities (Note O)	$ 30	$ (3)	$ (47)	$ (21)	$ (29)
Legal and environmental matters and reserves	(16)	1	(17)	—	(18)
Acquisition and integration-related charges	(2)	—	—	(5)	(7)
Employee benefit plan settlement and other charges	—	—	—	(21)	—
Impairment of goodwill and long-lived assets of Purification Solutions (Note F)	(254)	—	—	(562)	—
Non-recurring gain (loss) on foreign exchange	—	—	(11)	(2)	(3)
Gain on existing investment in NHUMO	—	—	—	—	29
Gains (losses) on sale of investments	10	—	—	—	—
Inventory adjustment (Note D)	(13)	—	—	(6)	—
Executive transition costs	(2)	—	(6)	—	—
Other certain items	(1)	(1)	—	—	—
Total certain items, pre-tax	(248)	(3)	(81)	(617)	(28)
Tax-related certain items:					
Tax impact of certain items[a]	31	1	31	94	17
Discrete tax items	(148)	25	—	13	(17)
Total tax-related certain items	(117)	26	31	107	—
Total certain items, net of tax	$ (365)	$ 23	$ (50)	$ (510)	$ (28)

(a) The tax impact of certain items is determined by (1) starting with the current and deferred income tax expense or benefit, included in Net income attributable to Cabot Corporation, and (2) subtracting the tax expense or benefit on "adjusted earnings". Adjusted earnings is defined as the pre-tax income attributable to Cabot Corporation excluding certain items. The tax expense or benefit on adjusted earnings is calculated by applying the operating tax rate, as defined under the section Definition of Terms and Non-GAAP Financial Measures in Results of Operations, to adjusted earnings.

(4) The Company's effective tax rate for fiscal 2018 was a provision of 165% which included net discrete tax expense of $120 million, composed of $159 million net tax impact of the Tax Cuts and Jobs Act of 2017 (the "Act"), and $3 million tax expense upon the sale of assets, offset by net tax benefits of $29 million related to impairment and $15 million from a change in valuation allowance on a beginning of year tax balance, and net tax charge of $2 million related to other miscellaneous tax items. The Company's effective tax rate for fiscal 2017 was a provision of 10% which included net discrete tax benefits of $25 million, composed of net tax benefits of $16 million associated with the generation of excess foreign tax credits upon repatriation of previously taxed foreign earnings and the accrual of U.S. tax on certain foreign earnings, a net tax benefit of $6 million from a change in valuation allowance on a beginning of year tax balance, net tax benefits of $4 million for various return to provision adjustments related to tax return filings and net tax charges of $1 million related to other miscellaneous tax items. The Company's effective tax rate for fiscal 2016 was a provision of 18%, which included less than $1 million of discrete tax charges, composed of charges of $5 million for valuation allowances on beginning of the year tax balances, partially offset by benefits of $3 million for a currency loss and $1 million each for the renewal of the U.S. research and experimentation credit and net tax settlements. The Company's effective tax rate for fiscal 2015 was a benefit of

12%, which included $13 million of discrete tax benefits composed of $7 million for tax settlements, $4 million for repatriation, and $2 million for the renewal of the U.S. research and experimentation credit. The Company's effective tax rate for fiscal 2014 was a provision of 30% which included net discrete charges of $17 million, composed of a $20 million charge for a valuation allowance, offset by $3 million of net tax benefit primarily related to tax settlements.

(5) In fiscal 2017, the Company adopted two new accounting standards that impact the presentation of debt issuance costs and the classification of deferred taxes on the Consolidated Balance Sheets. Fiscal 2014 has not been updated to reflect these new standards and may not be comparable to the other years presented.

(6) Net debt to capitalization ratio is calculated by dividing total debt (the sum of short-term and long-term debt less cash and cash equivalents) by total capitalization (the sum of Total stockholders' equity plus total debt).

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(7) Adjusted return on net assets ("adjusted RONA") measures how effectively and efficiently the Company uses its operating assets to generate earnings. Return on net assets ("RONA") and adjusted RONA are not measures of financial performance under accounting principles generally accepted ("GAAP") in the United States and should not be considered substitutes for measures of performance reported under GAAP. We believe adjusted RONA provides useful supplemental information to our investors because it allows investors to understand the basis on which management evaluates the Company's operational effectiveness and because it is a performance metric used in our equity incentive compensation program. We calculate adjusted RONA by dividing the most recent twelve months' adjusted net income (loss) (a non-GAAP numerator) by adjusted net assets (a non-GAAP denominator). In the numerator, we exclude "certain items" net of tax from income (loss) from continuing operations as calculated under GAAP. The items of expense and income we consider "certain items" are described in the discussion of Definition of Terms and Non-GAAP Financial Measures in Results of Operations. The denominator consists of our operating assets, which are: net property, plant and equipment; adjusted net working capital; assets held for rent; and investments in equity affiliates. We calculate the items in adjusted net assets using the most recent five quarters' average to normalize the impact of large inter-period movements (e.g. working capital movements caused by feedstock price volatility). Our calculation of adjusted RONA is as follows:

	Years Ended September 30				
	2018	2017	2016	2015	2014
	(In millions, except ratios)				
Return on Net Assets					
Income (loss) from continuing operations[a] [b]	$(74)	$273	$161	$(328)	$216
Net assets[b] [c]	$1,279	$1,625	$1,389	$1,338	$2,064
Return on net assets	(6)%	17%	12%	(25)%	10%
Adjusted Return on Net Assets					
Adjusted net income (loss)[a]:					
Income (loss) from continuing operations[b]	$(74)	$273	$161	$(328)	$216
Less: Total certain items, net of tax[d]	(365)	23	(50)	(510)	(28)
Adjusted net income (loss)	$291	$250	$211	$182	$244
Adjusted net assets[e]:					
Adjusted net working capital[b] [f]	$568	$474	$443	$607	$680
Net property, plant and equipment	1,290	1,267	1,322	1,416	1,612
Assets held for rent	110	101	92	67	54
Equity affiliates	56	55	55	63	82
Adjusted net assets	$2,024	$1,897	$1,912	$2,153	$2,428
Adjusted return on net assets	14%	13%	11%	9%	10%

(a) Income (loss) from continuing operations and Adjusted net income (loss) are aggregated four quarter rolling amounts.

(b) In fiscal 2018, the Company elected to change its inventory valuation method of accounting for its U.S. carbon black inventories from the LIFO method to the FIFO method. The Company applied this change retrospectively and fiscal 2017 and 2016 balances have been updated as discussed in Note A. Fiscal 2015 and 2014 have not been updated to reflect this change and may not be comparable to the other years presented.

(c) Net assets represents Total stockholders' equity.

(d) Total certain items, net of tax is detailed in the table in note (2) above.

(e) Each component of adjusted net assets is calculated by averaging previous five quarter ending balances.

(f)

Adjusted net working capital is the average of the previous five quarter ending balances of Accounts receivable plus Inventory less Accounts payable and accruals.

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

Our consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States ("GAAP"). This preparation of our financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues, and expenses and related disclosure of contingent assets and liabilities. We consider an accounting estimate to be critical to the financial statements if (i) the estimate is complex in nature or requires a high degree of judgment and (ii) different estimates and assumptions were used, the results could have a material impact on the consolidated financial statements. On an ongoing basis, we evaluate our estimates and the application of our policies. We base our estimates on historical experience, current conditions and on various other assumptions that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates. The policies that we believe are critical to the preparation of the consolidated financial statements are presented below.

Revenue Recognition

We recognize revenue when persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the price is fixed or determinable and collectability is reasonably assured. We generally are able to ensure that products meet customer specifications prior to shipment. If we are unable to determine that the product has met the specified objective criteria prior to shipment or if title has not transferred because of sales terms, the revenue is considered "unearned" and is deferred until the revenue recognition criteria are met.

Shipping and handling charges related to sales transactions are recorded as sales revenue when billed to customers or included in the sales price. Taxes collected on sales to customers are excluded from revenues.

The following table shows the relative size of the revenue recognized in each of our reportable segments:

	Years Ended September 30		
	2018	2017	2016
Reinforcement Materials	57 %	53 %	48 %
Performance Chemicals	33 %	35 %	37 %
Purification Solutions	9 %	11 %	13 %
Specialty Fluids	1 %	1 %	2 %

We derive the substantial majority of our revenues from the sale of products in our Reinforcement Materials, Performance Chemicals, and Purification Solutions segments. Revenue from these products is typically recognized when the product is shipped and title and risk of loss have passed to the customer. We offer cash discounts and volume rebates to certain customers as sales incentives. The discounts and volume rebates are recorded as a reduction in sales at the time revenue is recognized and are estimated based on historical experience and contractual obligations. We periodically review the assumptions underlying estimates of discounts and volume rebates and adjust revenues accordingly.

Revenue in Specialty Fluids arises primarily from the rental of cesium formate. This revenue is recognized throughout the rental period based on the contracted rental terms. Customers are also billed and revenue is recognized, typically at the end of the job, for cesium formate product that is not returned. We also generate revenues from cesium formate sold outside of the rental process and from the sale of fine cesium chemicals. This revenue is recognized upon delivery of the product.

Inventory Valuation

Effective October 1, 2017, we changed our method of accounting for U.S. carbon black inventories from the LIFO method to the FIFO method. Total U.S. inventories accounted for utilizing the LIFO cost flow assumption represented 7% of total worldwide inventories as of September 30, 2017 prior to this change in method. We believe the FIFO method is preferable because it: (i) conforms the accounting for U.S. carbon black inventories to the inventory valuation methodology for the majority of our other inventories; (ii) better represents how management assesses and reports on the performance of the Reinforcement Materials and Performance Chemicals operating segments that carry U.S. carbon black inventories, as the impact of accounting for this inventory on a LIFO basis has historically been excluded from segment results; (iii) better aligns the accounting for U.S. carbon black inventories with the physical flow of that inventory; and (iv) improves comparability with many of our peers. We applied this change retrospectively to all prior periods presented for which details are presented under the heading “Inventories” in Note A. The cost of Specialty Fluids inventories that are classified as inventory and assets held for rent is determined using the average cost method. The cost of all other inventories is determined using the FIFO method.

We periodically review inventory for both potential obsolescence and potential declines in anticipated selling prices. In this review, we make assumptions about the future demand for and market value of the inventory, and based on these assumptions estimate the amount of any obsolete, unmarketable, slow moving or overvalued inventory. We write down the value of our inventories by an amount equal to the difference between the cost of the inventory and its estimated net realizable value. Historically, such write-downs have not been material. If actual market conditions are less favorable than those projected by management at the time of the assessment, however, additional inventory write-downs may be required, which could reduce our gross profit and our earnings.

Intangible Assets and Goodwill Impairment

We record tangible and intangible assets acquired and liabilities assumed in business combinations under the acquisition method of accounting. Amounts paid for an acquisition are allocated to the assets acquired and liabilities assumed based on their fair values at the date of acquisition. We use assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets requires the use of significant judgment with regard to assumptions used in the valuation model. We estimate the fair value of identifiable acquisition-related intangible assets principally based on projections of cash flows that will arise from these assets. The projected cash flows are discounted to determine the fair value of the assets at the dates of acquisition. As discussed in Note C of our Notes to the Consolidated Financial Statements, we acquired Tech Blend in November 2017, and the purchase price allocation included separately identifiable intangible assets of $29 million.

Definite-lived intangible assets, which are comprised of trademarks, customer relationships and developed technologies, are amortized over their estimated useful lives and are reviewed for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. We recognized an impairment on intangible assets associated with the Purification Solutions business in the second fiscal quarter of 2018, which is discussed in detail below under the heading “Purifications Solutions Goodwill and Long-lived Assets Impairment Charges”.

Goodwill is comprised of the purchase price of business acquisitions in excess of the fair value assigned to the net tangible and identifiable intangible assets acquired. Goodwill is not amortized, but is reviewed for impairment annually as of May 31, or when events or changes in the business environment indicate that the carrying value of the reporting unit may exceed its fair value. A reporting unit, for the purpose of the impairment test, is at or below the operating segment level, and constitutes a business for which discrete financial information is available and regularly reviewed by segment management. Reinforcement Materials, and the Fumed Metal Oxides and Specialty Compounds businesses within Performance Chemicals, which are considered separate reporting units, carried our Goodwill balances as of May 31, 2018. The Purification Solutions reporting unit has no remaining goodwill balance subsequent to the goodwill impairment charge recorded in the second quarter of fiscal 2018. As part of the Tech Blend acquisition, goodwill of $33 million was generated and is reflected in the Specialty Compounds reporting unit.

For the purpose of the goodwill impairment test, we first assess qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If an initial qualitative assessment identifies that it is more likely than not that the carrying value of a reporting unit exceeds its estimated fair value, an additional quantitative evaluation is performed. Alternatively, we may elect to proceed directly to the quantitative goodwill impairment test. If based on the quantitative evaluation the fair value of the reporting unit is less than its carrying amount, a goodwill impairment loss would result. The goodwill impairment loss would be the amount by which the carrying value of the reporting unit, including goodwill, exceeds its fair value, limited to the total amount of goodwill allocated to that reporting unit. The fair value of a reporting unit is based on discounted estimated future cash flows. The fair value is also benchmarked against a market approach using the guideline public companies method. The assumptions used to estimate fair value include management’s best estimates of future growth rates, operating cash flows, capital expenditures and discount rates over an estimate of the remaining operating period at the reporting unit level. Refer to the discussion under the heading “Purification Solutions Goodwill and Long-Lived Assets

Impairment Charges" for details on the Purification Solutions goodwill impairment test and the resulting charge recorded in the second quarter of fiscal 2018 and refer to Note G of our Notes to the Consolidated Financial Statements for the results of our annual goodwill impairment test performed as of May 31, 2018.

Long-lived Assets Impairment

Our long-lived assets primarily include property, plant and equipment, intangible assets, long-term investments and assets held for rent. The carrying values of long-lived assets are reviewed for impairment whenever events or changes in business circumstances indicate that the carrying amount of an asset may not be recoverable.

To test for impairment of assets, we generally use a probability-weighted estimate of the future undiscounted net cash flows of the assets over their remaining lives to determine if the value of the asset is recoverable. Long-lived assets are grouped with other assets and liabilities at the lowest level for which independent identifiable cash flows are determinable.

An asset impairment is recognized when the carrying value of the asset is not recoverable based on the analysis described above, in which case the asset is written down to its fair value. If the asset does not have a readily determinable market value, a discounted cash flow model may be used to determine the fair value of the asset. In circumstances when an asset does not have separate identifiable cash flows, an impairment charge is recorded when we no longer intend to use the asset. In the second quarter of fiscal 2018, we determined that the long-lived asset group of Purification Solutions was not recoverable and accordingly, we recorded an impairment charge for the carrying value in excess of the fair value of the asset group, as described below under the heading “Purification Solutions Goodwill and Long-Lived Assets Impairment Charges”.

Purification Solutions Goodwill and Long-Lived Assets Impairment Charges

During the second quarter of fiscal 2018 as a result of the impairment tests performed on goodwill and long-lived assets of the Purification Solutions reporting unit, we recorded impairment charges and an associated tax benefit in the Consolidated Statements of Operations as follows:

	Three Months Ended March 31, 2018 (In millions)
Goodwill impairment charge	$ 92
Long-lived assets impairment charge	162
Benefit for income taxes	(30)
Impairment charges, net of tax	$ 224

In the second quarter of fiscal 2018, the Purification Solutions reporting unit experienced further share losses, lower customer demand and declining prices in the mercury removal and North America powdered activated carbon applications, which led us to reassess our previous estimates for expected growth in volumes, prices and margins in the reporting unit. The forecasted demand and profit margins in mercury removal applications were lowered reflecting further unit closures at coal-fired utility plants, lower usage levels of activated carbon and lower plant utilization levels for coal-fired utilities, as well as lower pricing due to industry overcapacity, among other factors. While development programs continue to progress, growth estimates in other environmental and specialty applications were also lowered, reflecting heightened competition and updated timelines to commercialize certain new products. Due to these revised forecasts, we performed the quantitative goodwill impairment test and determined that the estimated fair value of the Purification Solutions reporting unit was lower than the reporting unit's carrying value, resulting in a goodwill impairment charge of $92 million.

In determining the fair value of the Purification Solutions reporting unit, we used an income approach (a discounted cash flow analysis) which incorporated significant estimates and assumptions related to future periods, including growth rates in environmental and specialty applications and pricing assumptions of activated carbon, among others. In addition, an estimate of the reporting unit’s weighted average cost of capital (“WACC”) was used to discount future estimated cash flows to their present value. The WACC was based upon externally available data considering market participants’ cost of equity and debt, optimal capital structure and risk factors specific to the Purification Solutions reporting unit.

Prior to determining the goodwill impairment charge, we considered whether the assets of the reporting unit, which is also considered the asset group, were recoverable. As a result of this assessment, we recorded an inventory reserve adjustment of $13 million and impairments to long lived assets of $162 million. The adjustment to inventory carrying value was determined based on reassessments of volumes, pricing, and margins described above and was recorded in Cost of sales in the Consolidated Statements of Operations. The impairment analysis to assess if definite-lived intangible assets and property, plant and equipment were recoverable was based on the estimated undiscounted cash flows of the reporting unit, and these cash flows were not sufficient to recover the carrying value of the long-lived assets over their remaining useful lives. Accordingly, we recorded impairment charges of $64 million and $98 million, to our definite-lived intangible assets and property, plant and equipment, respectively, in the second quarter of fiscal 2018 based on the lower of the carrying amount or fair value of the long-lived assets.

We used the income approach to determine the fair value of the definite-lived intangible assets and the cost approach to determine the fair value of our property, plant and equipment. We will continue to monitor for events or changes in business circumstances that may indicate that the remaining carrying value of the asset group may not be recoverable.

We recorded a tax benefit related to the impairment charges of $30 million in the second quarter of fiscal 2018 which was subsequently reduced by $1 million after the impairment charges by tax jurisdiction were finalized.

Pensions and Other Postretirement Benefits

We maintain both defined benefit and defined contribution plans for our employees. In addition, we provide certain postretirement health care and life insurance benefits for our retired employees. Plan obligations and annual expense calculations are based on a number of key assumptions. The assumptions, which are specific for each of our U.S. and foreign plans, are related to both the assets we hold to fund our plans (where applicable) and the characteristics of the benefits that will ultimately be provided to our employees. The most significant assumptions relative to our plan assets include the anticipated rates of return on these assets. Assumptions relative to our pension obligations are more varied; they include estimated discount rates, rates of compensation increases for employees, and mortality, employee turnover and other related demographic data. Projected health care and life insurance obligations also rely on the above mentioned demographic assumptions and assumptions surrounding health care cost trends. Actual results that differ from the assumptions are generally accumulated and amortized over future periods and could therefore affect the recognized expense and recorded obligation in such future periods. However, cash flow requirements may be different from the amounts of expense that are recorded in the consolidated financial statements.

Litigation and Contingencies

We are involved in litigation in the ordinary course of business, including personal injury and environmental litigation. After consultation with counsel, as appropriate, we accrue a liability for litigation when it is probable that a liability has been incurred and the amount can be reasonably estimated. The estimated reserves are recorded based on our best estimate of the liability associated with such matters or the low end of the estimated range of liability if we are unable to identify a better estimate within that range. Our best estimate is determined through the evaluation of various information, including claims, settlement offers, demands by government agencies, estimates performed by independent third parties, identification of other responsible parties and an assessment of their ability to contribute, and our prior experience. Litigation is highly uncertain and there is always the possibility of an unusual result in any particular case that may reduce our earnings and cash flows.

The most significant reserves that we have established are for environmental remediation and respirator litigation claims. The amount accrued for environmental matters reflects our assumptions about remediation requirements at the contaminated sites, the nature of the remedies, the outcome of discussions with regulatory agencies and other potentially responsible parties at multi-party sites, and the number and financial viability of other potentially responsible parties. These liabilities can be affected by the availability of new information, changes in the assumptions on which the accruals are based, unanticipated government enforcement action or changes in applicable government laws and regulations, which could result in higher or lower costs.

Our current estimate of the cost of our share of existing and future respirator liability claims is based on facts and circumstances existing at this time. Developments that could affect our estimate include, but are not limited to, (i) significant changes in the number of future claims, (ii) changes in the rate of dismissals without payment of pending claims, (iii) significant changes in the average cost of resolving claims, (iv) significant changes in the legal costs of defending these claims, (v) changes in the nature of claims received, (vi) changes in the law and procedure applicable to these claims, (vii) the financial viability of other parties that contribute to the settlement of respirator claims, (viii) a change in the availability of insurance coverage maintained by certain of the other parties that contribute to the settlement of respirator claims, or the indemnity provided by a former owner of the business, (ix) changes in the allocation of costs among the various parties paying legal and settlement costs and (x) a determination that the assumptions that were used to estimate our share of liability are no longer reasonable. We cannot determine the impact of these potential developments on our current estimate of our share of liability for these existing and future claims. Accordingly, the actual amount of these liabilities for existing and future claims could be different than the reserved amount.

Income Taxes

Our business operations are global in nature, and we are subject to taxes in numerous jurisdictions. Tax laws and tax rates vary substantially in these jurisdictions and are subject to change based on the political and economic climate in those countries. We file our tax returns in accordance with our interpretations of each jurisdiction’s tax laws.

Significant judgment is required in determining our worldwide provision for income taxes and recording the related tax assets and liabilities. In the ordinary course of our business, there are operational decisions, transactions, facts and circumstances, and calculations which make the ultimate tax determination uncertain. Furthermore, our tax positions are periodically subject to challenge by taxing authorities throughout the world. We have recorded reserves for taxes and associated interest and penalties that may become payable in future years as a result of audits by tax authorities. Any significant impact as a result of changes in underlying facts, law, tax rates, tax audit, or review could lead to adjustments to our income tax expense, our effective tax rate, and/or our cash flow. For instance, on December 22, 2017, the U.S. enacted significant changes to federal income tax law affecting us. Refer to the discussion under the heading “Tax Reform” in Note R of our Notes to the Consolidated Financial Statements (“Note R”).

We record benefits for uncertain tax positions based on an assessment of whether the position is more likely than not to be sustained by the taxing authorities. If this threshold is not met, no tax benefit of the uncertain tax position is recognized. If the threshold is met, the tax benefit that is recognized is the largest amount that is greater than 50% likely of being realized upon ultimate settlement. This analysis presumes the taxing authorities' full knowledge of the positions taken and all relevant facts, but does not consider the time value of money. We also accrue for interest and penalties on these uncertain tax positions and include such charges in the income tax provision in the Consolidated Statements of Operations.

Additionally, we have established valuation allowances against a variety of deferred tax assets, including net operating loss carry-forwards, foreign tax credits, and other income tax credits. Valuation allowances take into consideration our ability to use these deferred tax assets and reduce the value of such items to the amount that is deemed more likely than not to be recoverable. Our ability to utilize these deferred tax assets is dependent on achieving our forecast of future taxable operating income over an extended period of time. We review our forecast in relation to actual results and expected trends on a quarterly basis. Failure to achieve our operating income targets may change our assessment regarding the recoverability of our net deferred tax assets and such change could result in a valuation allowance being recorded against some or all of our net deferred tax assets. An increase in a valuation allowance would result in additional income tax expense, while a release of valuation allowances in periods when these tax attributes become realizable would reduce our income tax expense.

Significant Accounting Policies

We have other significant accounting policies that are discussed in Note A in Item 8 below. Certain of these policies include the use of estimates, but do not meet the definition of critical because they generally do not require estimates or judgments that are as difficult or subjective to measure. However, these policies are important to an understanding of the consolidated financial statements.

Recently Issued Accounting Pronouncements

Refer to the discussion in Note B of our Notes to the Consolidated Financial Statements.

Results of Operations

Cabot is organized into four reportable business segments: Reinforcement Materials, Performance Chemicals, Purification Solutions, and Specialty Fluids. Cabot is also organized for operational purposes into three geographic regions: the Americas; Europe, Middle East and Africa; and Asia Pacific. The discussions of our results of operations for the periods presented reflect these structures.

Our analysis of financial condition and operating results should be read with our consolidated financial statements and accompanying notes. Unless a calendar year is specified, all references to years in this discussion are to our fiscal years ended September 30.

Definition of Terms and Non-GAAP Financial Measures

When discussing our results of operations, we use several terms as described below.

The term "product mix" refers to the mix of types and grades of products sold or the mix of geographic regions where products are sold, and the positive or negative impact this has on the revenue or profitability of the business and/or segment.

Our discussion under the heading “Provision (Benefit) for Income Taxes and Reconciliation of Effective Tax Rate to Operating Tax Rate” includes a discussion of our “effective tax rate” and our “operating tax rate” and includes a reconciliation of the two rates. Our operating tax rate is a non-GAAP financial measure and should not be considered as an alternative to our effective tax rate, the most comparable GAAP financial measure. In calculating our operating tax rate, we exclude discrete tax items, which include: i) unusual or infrequent items such as a significant release or establishment of a valuation allowance, ii) items related to uncertain tax positions such as the tax impact of audit settlements, interest on tax reserves, and the release of tax reserves from the expiration of statutes of limitations, and iii) other discrete tax items, such as the tax impact of legislative changes and, on a quarterly basis, the timing of losses in certain jurisdictions and the cumulative rate adjustment, if applicable. We also exclude the tax impact of certain items, as defined below in the discussion of Total segment EBIT, on both operating income and the tax provision. Our definition of the operating tax rate may not be comparable to the definition used by other companies. Management believes that the non-GAAP financial measure is useful supplemental information because it helps our investors compare our tax rate year to year on a consistent basis and understand what our tax rate on current operations would be without the impact of these items.

Our discussion under the heading "Fiscal 2018 compared to Fiscal 2017 and Fiscal 2017 compared to Fiscal 2016—By Business Segment" includes a discussion of Total segment EBIT, which is a non-GAAP financial measure defined as Income (loss) from continuing operations before income taxes and equity in earnings from affiliated companies less certain items and other unallocated items. Our Chief Operating Decision Maker, who is our President and Chief Executive Officer, uses segment EBIT to evaluate the operating results of each segment and to allocate resources to the segments. We believe Total segment EBIT, which reflects the sum of EBIT from our four reportable segments, provides useful supplemental information for our investors as it is an important indicator of our operational strength and performance, allows investors to see our results through the eyes of management, and provides context for our discussion of individual business segment performance. Total segment EBIT should not be considered an alternative for Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies, which is the most directly comparable GAAP financial measure. A reconciliation of Total segment EBIT to Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies is provided under the heading "Fiscal 2018 compared to Fiscal 2017 and Fiscal 2017 compared to Fiscal 2016—By Business Segment". Investors should consider the limitations associated with this non-GAAP measure, including the potential lack of comparability of this measure from one company to another.

In calculating Total segment EBIT, we exclude from our Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies (i) items of expense and income that management does not consider representative of our fundamental on-going segment results, which we refer to as "certain items", and (ii) items that, because they are not controlled by the business segments and primarily benefit corporate objectives, are not allocated to our business segments, such as interest expense and other corporate costs, which include unallocated corporate overhead expenses such as certain corporate salaries and headquarter expenses, plus costs related to special projects and initiatives, which we refer to as "other unallocated items". Management believes excluding the items identified as certain items facilitates operating performance comparisons from period to period by eliminating differences caused by the existence and timing of certain expense and income items that would not otherwise be apparent on a GAAP basis and also facilitates an evaluation of our operating performance without the impact of these costs or benefits. The items of income and expense that we have excluded from Total segment EBIT, as applicable, but that are included in our GAAP Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies, as applicable, are described below.

- Asset impairment charges, which primarily include charges associated with an impairment of goodwill or other long-lived assets.
- Global restructuring activities include costs or benefits associated with cost reduction initiatives or plant closures, which primarily relate to (i) employee termination costs, (ii) asset impairment charges associated with restructuring actions, (iii) costs to close facilities, including environmental costs and contract termination penalties and (iv) gains realized on the sale of land or equipment associated with restructured plants or locations.
- Inventory reserve adjustment, which resulted from an evaluation performed as part of an impairment analysis.
- Acquisition and integration-related charges, which include transaction costs, redundant costs incurred during the period of integration, and costs associated with transitioning certain management and business processes to our processes.
- Legal and environmental reserves and matters, which consist of costs or benefits for matters typically related to former businesses or that are otherwise incurred outside of the ordinary course of business.
- Gains (losses) on sale of investments, which primarily relate to the sale of investments accounted for using the cost method.
- Non-recurring gains (losses) on foreign exchange, which primarily relate to the impact of controlled currency devaluations on our net monetary assets denominated in that currency.
- Executive transition costs, which include incremental charges, including stock compensation charges, associated with the retirement or termination of employment of senior executives of the Company.
- Employee benefit plan settlement charges, which consist of the costs associated with transferring the obligations and assets held by one of our defined benefit plans to a multi-employer plan.

Drivers of Demand and Key Factors Affecting Profitability

Drivers of demand and key factors affecting our profitability differ by segment. In Reinforcement Materials, longer term demand is driven primarily by: i) the number of vehicle miles driven globally; ii) the number of original equipment and replacement tires produced; and iii) the number of automotive builds. Over the past several years, operating results have been driven by a number of factors, including: i) increases or decreases in our sales volumes driven by changes in production levels for tires or industrial rubber products and the level at which we service that demand; ii) changes in raw material costs and our ability to adjust the sales price for our products commensurate with changes in raw material costs; iii) changes in pricing and product mix, which includes customer pricing as well as the mix of products sold or the region in which they are sold; iv) global and regional capacity utilization for carbon black; v) fixed cost savings achieved through restructuring and other cost saving activities; vi) the growth of our volumes and market position in emerging economies; vii) capacity management and technology investments, including the impact of energy utilization and yield improvement technologies at our manufacturing facilities; and viii) royalties and technology payments related to our patented elastomer composites technology that is used in tire applications.

In Performance Chemicals, longer term demand is driven primarily by the construction and infrastructure, automotive, electronics and consumer products industries. In recent years, operating results in Performance Chemicals have been driven by: i) increases or decreases in sales volumes to the industries previously noted; ii) our ability to deliver differentiated products that drive enhanced performance in customers' applications; iii) our ability to obtain value pricing for this differentiation; iv) the cost of new capacity; v) changes in selling prices relative to variations in the cost of raw materials; and vi) the adoption of new products for use in our customers' applications.

In Purification Solutions, longer term demand is driven primarily by the demand for activated carbon based solutions for water, gas and air, pharmaceuticals, food and beverages, catalysts and other chemical applications. Operating results in Purification Solutions have been influenced by: i) changes in our sales volumes in the various applications previously noted; ii) the amount of coal-based power generation utilized in the U.S. and the regulation of those utilities; iii) management of our operations, including inventory levels, and the commensurate costs; iv) changes in price and product mix; and v) industry capacity utilization.

In Specialty Fluids, longer term demand is primarily driven by: i) the level of drilling activity utilizing cesium formate for high pressure oil and gas wells; ii) the petroleum industry's acceptance of cesium formate as a drilling and completion fluid for this application; and iii) continued use of fine cesium chemicals in a variety of applications. Operating results in Specialty Fluids are influenced by the number of drilling projects as well as the size, type and duration of those drilling jobs and demand for fine cesium chemicals.

Overview of Results for Fiscal 2018

During fiscal 2018, Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies decreased compared to fiscal 2017 primarily due to the Purification Solutions goodwill and long-lived asset impairment charge recorded in the second quarter of fiscal 2018.

Fiscal 2018 compared to Fiscal 2017 and Fiscal 2017 compared to Fiscal 2016—Consolidated

Net Sales and Other Operating Revenues and Gross Profit

	Years Ended September 30		
	2018	2017	2016
	(In millions)		

Net sales and other operating revenues	$3,242	$2,717	$2,411
Gross profit	$781	$663	$575

The $525 million increase in net sales from fiscal 2017 to fiscal 2018 was due primarily to a more favorable price and product mix (combined $323 million), higher volumes ($110 million) and a favorable impact from foreign currency translation ($83 million). The more favorable price and product mix was primarily due to higher spot pricing in Asia and higher selling prices related to calendar year 2018 tire customer agreements. The $306 million increase in net sales from fiscal 2016 to fiscal 2017 was due primarily to a more favorable price and product mix (combined $248 million), an increase in volumes ($77 million), partially offset by an unfavorable impact from foreign currency translation ($24 million). The favorable price and product mix impact was primarily due to higher selling prices during the year from price adjustments to customers for increases in raw materials costs.

Gross profit increased by $118 million in fiscal 2018 when compared to fiscal 2017 driven by higher volumes and unit margins in Reinforcement Materials, partially offset by higher fixed costs. Gross profit increased by $88 million in fiscal 2017 when compared to fiscal 2016 driven by higher margins and volumes in Reinforcement Materials.

Selling and Administrative Expenses

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Selling and administrative expenses	$305	$260	$275

Selling and administrative expenses increased by $45 million in fiscal 2018 when compared to fiscal 2017.The increase was principally driven by higher corporate administrative costs, an increase in the reserve for respirator liability matters and higher spending on projects and growth initiatives. Selling and administrative expenses decreased by $15 million in fiscal 2017 when compared to fiscal 2016 primarily due to lower spending on global restructuring activities in fiscal 2017 and a charge to the respirator reserve in fiscal 2016 that did not reoccur in fiscal 2017.

Research and Technical Expenses

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Research and technical expenses	$66	$ 56	$ 53

Research and technical expenses increased by $10 million in fiscal 2018 when compared to fiscal 2017 primarily due to growth investment spending. Research and technical expenses increased by $3 million in fiscal 2017 when compared to fiscal 2016 due to continued spending on projects across the segments.

Purification Solutions Long-Lived Assets and Goodwill Impairment Charges

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Purification Solutions long-lived assets impairment charge	$162	$ —	$ —
Purification Solutions goodwill impairment charge	$92	$ —	$ —

The Purification Solutions long-lived assets and goodwill impairment charges recorded during fiscal 2018 are described in Note F of our Notes to the Consolidated Financial Statements (“Note F”).

Interest and Dividend Income

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Interest and dividend income	$10	$ 9	$ 5

Interest and dividend income increased by $1 million in fiscal 2018 when compared to fiscal 2017 due to higher interest rates and by $4 million in fiscal 2017 when compared to fiscal 2016 due primarily to interest earned on higher cash balances.

Interest Expense

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Interest expense	$54	$ 53	$ 54

Interest expense increased by $1 million in fiscal 2018 as compared to fiscal 2017. The increase was primarily due to higher interest rates and higher commercial paper borrowings throughout the fiscal year. Interest expense decreased by $1 million in fiscal 2017 as compared to fiscal 2016. The decrease was primarily due to lower interest rates on long-term debt partially offset by higher rates on commercial paper borrowings.

Other Income (Expense)

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Other income (expense)	$5	$ (4)	$ (7)

Other income (expense) changed during fiscal 2018 by $9 million as compared to fiscal 2017 primarily due to a gain recorded in 2018 on the sale of investments. Other income (expense) changed by $3 million during fiscal 2017 as compared to fiscal 2016 due primarily to the impact of foreign currency movements.

Provision (Benefit) for Income Taxes and Reconciliation of Effective Tax Rate to Operating Tax Rate

	Years Ended September 30		
	2018	2017	2016
	(Dollars in millions)		
Provision (benefit) for income taxes	$193	$ 33	$ 33
Effective tax rate[1]	165 %	10 %	18 %
Impact of discrete tax items:			
Unusual or infrequent items[2]:	(137)%	6 %	2 %
Items related to uncertain tax positions	(2)%	(1)%	1 %
Other discrete tax items	12 %	4 %	(2)%
Impact of certain items	(17)%	— %	5 %
Operating tax rate	21 %	19 %	24 %

(1) Refer to the reconciliation of computed tax expense at the federal statutory rate to the Provision (benefit) for income taxes in Note R.

(2) For fiscal 2018, fiscal 2017 and fiscal 2016, Impact of discrete tax items included net discrete tax expense of $148 million, net discrete tax benefit of $25 million and net discrete tax expense of less than $1 million, respectively. Discrete tax items for years ended September 30, 2018, 2017 and 2016 were as follows:

(i) Unusual or infrequent items during fiscal 2018 consisted of the net tax impacts of the Act (net tax expense of $159 million), cash management activities, foreign exchange gain/loss on the remeasurement of a deferred tax liability, and excludible foreign exchange gains and losses in certain jurisdictions. Unusual or infrequent items during fiscal 2017 consisted of the net tax impacts of excess foreign tax credits upon repatriation of previously taxed foreign earnings and the accrual of U.S. tax on certain foreign earnings. Unusual or infrequent items during fiscal 2016 included net tax impacts from the renewal of the U.S. Research and Experimentation credit, extraordinary dividends from subsidiaries, a claim for U.S. tax benefit, and other non-routine items;

(ii) Items related to uncertain tax positions during fiscal 2018, 2017 and 2016 included net tax impacts from the reversal of accruals for uncertain tax positions due to the expiration of statutes of limitations and settlement of tax audits, the accrual of interest on uncertain tax positions, and the accrual of prior year uncertain tax positions, and;

(iii) Other discrete tax items during fiscal 2018, 2017 and 2016 included changes in valuation allowances on beginning of year tax balances, the net tax impact of various return to provision adjustments related to tax return filings, changes in non-U.S. tax laws and audit settlements (fiscal 2018 only).

Our effective and operating tax rates for fiscal 2019 are expected to be the same and in the range between 22% and 24%.

We file U.S. federal and state and non-U.S. income tax returns in jurisdictions with varying statutes of limitations. Cabot and certain subsidiaries are under audit in a number of jurisdictions. It is possible that some of these audits will be resolved in fiscal 2019 and could impact our anticipated effective tax rate. We have filed our tax returns in accordance with the tax laws in each jurisdiction and maintain tax reserves for uncertain tax positions.

Tax Reform

On December 22, 2017, the U.S. enacted significant changes to federal income tax law affecting us, including a permanent reduction of the U.S. corporate income tax rate from 35% to 21%, effective January 1, 2018, as well as a 100% dividend received deduction for foreign dividends. Although the passage of the Act reduced the U.S. tax rate and effectively created a participation exemption regime, our future earnings could be negatively impacted by certain other aspects of the new legislation, including in particular, immediate U.S. taxation of global intangible low-taxed income (“GILTI”) earned by foreign subsidiaries. In transitioning to this new full participation exemption regime for foreign earnings, we are also subject to a one-time tax on the deemed repatriation of certain foreign earnings. Refer to the discussion under the heading “Tax Reform” in Note R.

Equity in Earnings of Affiliated Companies and Net Income (Loss) Attributable to Noncontrolling Interest, Net of Tax

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Equity in earnings of affiliated companies, net of tax	$2	$ 7	$ 3
Net income (loss) attributable to noncontrolling interests, net of tax	$39	$ 25	$ 15

Equity in earnings of affiliated companies, net of tax, decreased by $5 million in fiscal 2018 compared to fiscal 2017 and increased by $4 million in fiscal 2017 compared to fiscal 2016. The changes in both periods were primarily due to changes in earnings from our Venezuelan equity affiliate.

Net income (loss) attributable to noncontrolling interests, net of tax, increased by $14 million in fiscal 2018 compared to fiscal 2017 and increased by $10 million in fiscal 2017 compared to fiscal 2016 due to the higher profitability of our joint ventures in China and the Czech Republic.

Net Income (Loss) Attributable to Cabot Corporation

In fiscal 2018, we reported a net loss of $113 million ($1.85 loss per diluted common share). In fiscal 2017, we reported net income of $248 million ($3.91 per diluted common share). In fiscal 2016, we reported net income of $147 million ($2.32 per diluted common share). The loss in fiscal 2018 was driven by the Purification Solutions long-lived asset and goodwill impairment charges more fully discussed in Note F and the impact of tax reform in the U.S.

Fiscal 2018 compared to Fiscal 2017 and Fiscal 2017 compared to Fiscal 2016—By Business Segment

Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies, certain items, other unallocated items and Total segment EBIT for fiscal 2018, 2017 and 2016 are set forth in the table below. The details of certain items and other unallocated items are shown below and in Note T of our Notes to the Consolidated Financial Statements.

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies	$117	$299	$191
Less: Certain items, pre-tax	(248)	(3)	(81)
Less: Other unallocated items	(115)	(107)	(98)
Total segment EBIT	$480	$409	$370

In fiscal 2018, Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies decreased by $182 million, primarily due to the impairment of goodwill and long-lived assets of Purification Solutions ($254 million). Total segment EBIT increased by $71 million when compared to fiscal 2017. The increase in Total segment EBIT was driven by higher unit margins ($73 million), higher volumes ($53 million) and the favorable impact of foreign currency translation ($20 million), partially offset by higher fixed costs ($64 million). The increase in margins and volumes was driven by Reinforcement Materials and Performance Chemicals. The increase in fixed costs in fiscal 2018 was due to several factors: (i) higher sales volumes, which led to higher costs in areas such as warehousing and shipping; (ii) costs associated with the construction of new manufacturing facilities in the fumed metal oxides business in North America and China that are not yet operational; (iii) higher maintenance costs to ensure asset reliability as our volumes grow; and (iv) higher commercial and technology investment to drive business and new product growth.

In fiscal 2017, Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies increased by $108 million and Total segment EBIT increased by $39 million when compared to fiscal 2016. The increases were primarily driven by higher volumes across all segments except Specialty Fluids ($43 million), higher unit margins in Reinforcement Materials ($62 million), and a favorable impact from changing inventory levels ($23 million), partially offset by higher fixed costs ($49 million), and lower unit margins in Performance Chemicals ($33 million).

Certain Items:

Details of the certain items for fiscal 2018, 2017, and 2016 are as follows:

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Impairment of goodwill and long-lived assets of Purification Solutions (Note F)	$(254)	$—	$—
Global restructuring activities (Note O)	30	(3)	(47)
Legal and environmental matters and reserves	(16)	1	(17)
Inventory reserve adjustment (Note D)	(13)	—	—
Gains (losses) on sale of investments	10	—	—
Acquisition and integration-related charges	(2)	—	—
Executive transition costs	(2)	—	(6)
Non-recurring gain (loss) on foreign exchange	—	—	(11)
Other certain items	(1)	(1)	—
Total certain items, pre-tax	(248)	(3)	(81)
Tax-related certain items:			
Tax impact of certain items	31	1	31
Discrete tax items	(148)	25	—
Total tax-related certain items	(117)	26	31
Total certain items, net of tax	$(365)	$ 23	$(50)

An explanation of these items of expense and income is included in our discussion under the heading "Definition of Terms and Non-GAAP Financial Measures". Additional information concerning several of these items is included in our Notes to the Consolidated Financial Statements as follows: Impairment of goodwill and long-lived assets (Note F); Global restructuring activities (Note O); and Inventory reserve adjustment (Note D).

Tax-related certain items include discrete tax items, the nature of which are discussed under the heading "Provision (Benefit) for Income Taxes and Reconciliation of Effective Tax Rate to Operating Tax Rate". The tax impact of certain items is determined by (1) starting with the current and deferred income tax expense or benefit, included in Net income (loss) attributable to Cabot Corporation, and (2) subtracting the tax expense or benefit on "adjusted earnings". Adjusted earnings is defined as the pre-tax income attributable to Cabot Corporation excluding certain items. The tax expense or benefit on adjusted earnings is calculated by applying the operating tax rate, as defined under the heading Definition of Terms and Non-GAAP Financial Measures, to adjusted earnings.

Other Unallocated Items:

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Interest expense	$(54)	$(53)	$(54)
Unallocated corporate costs	(61)	(50)	(45)
General unallocated income (expense)	2	3	4

Less: Equity in earnings of affiliated companies, net of tax	2	7	3
Total other unallocated items	$(115)	$(107)	$(98)

A discussion of items that we refer to as “other unallocated items” can be found under the heading “Definition of Terms and Non-GAAP Financial Measures”. The balances of unallocated corporate costs are primarily comprised of expenditures related to managing a public company that are not allocated to the segments and corporate business development costs related to ongoing corporate projects. The balances of General unallocated income (expense) consists of gains (losses) arising from foreign currency transactions, net of other foreign currency risk management activities, interest income, dividend income, the profit or loss related to the corporate adjustment for unearned revenue, and the impact of including the full operating results of a contractual joint venture in Purification Solutions Segment EBIT.

In fiscal 2018, Total other unallocated items changed by $8 million when compared to fiscal 2017, primarily driven by a change of $11 million in Unallocated corporate costs and a change of $1 million in General unallocated income, partially offset by a change of $5 million in Equity in earnings of affiliated companies, net of tax. The change in Unallocated corporate costs was primarily due to corporate project spending and higher incentive compensation.

In fiscal 2017, Total other unallocated items changed by $9 million when compared to fiscal 2016, primarily driven by a change of $4 million of Equity in earnings of affiliated companies, net of tax, due to lower earnings from our Venezuelan equity affiliate. In addition, Unallocated corporate costs changed by $5 million primarily associated with higher expenses related to incentive compensation.

Reinforcement Materials

Sales and EBIT for Reinforcement Materials for fiscal 2018, 2017 and 2016 are as follows:

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Reinforcement Materials Sales	$1,774	$1,381	$1,108
Reinforcement Materials EBIT	$279	$193	$137

In fiscal 2018, sales in Reinforcement Materials increased by $393 million when compared to fiscal 2017. The increase was principally driven by a more favorable price and product mix (combined $307 million), higher volumes ($44 million) and a favorable comparison from foreign currency translation ($42 million). The more favorable price and product mix was primarily due to higher pricing from 2018 tire customer agreements, higher spot pricing in Asia, and the passthrough of higher feedstock costs in our pricing. Higher volumes were driven by higher demand in the Americas and Europe.

In fiscal 2017, sales in Reinforcement Materials increased by $273 million when compared to fiscal 2016. The increase was principally driven by a more favorable price and product mix (combined $260 million) and higher volumes ($27 million), partially offset by the unfavorable comparison of foreign currency translation ($12 million). The more favorable price and product mix was primarily driven by benefits from higher prices in our tire customer agreements and spot pricing in addition to a more favorable regional mix. Higher volumes were driven by an increase in rubber blacks volumes from higher contractual volumes in the Americas.

In fiscal 2018, Reinforcement Materials EBIT increased by $86 million when compared to fiscal 2017 driven principally by higher unit margins ($89 million), higher volumes ($19 million) and the favorable comparison of foreign currency translation ($13 million), partially offset by higher fixed costs ($33 million). Higher unit margins were driven primarily by 2018 contract gains and a favorable spot market in Asia. The higher volumes were primarily due to higher demand in the Americas and Europe. The increase in fixed costs was due to several factors: (i) higher sales volumes, which led to higher costs in areas such as warehousing and shipping; (ii) higher maintenance costs to ensure asset reliability as our volumes grow; and (iii) higher commercial and technology investment to drive business and new product growth.

In fiscal 2017, Reinforcement Materials EBIT increased by $56 million when compared to fiscal 2016 driven principally by higher rubber blacks unit margins ($62 million), higher rubber blacks volumes ($13 million) and the favorable impact from a change in inventory levels ($6 million), partially offset by higher fixed costs ($21 million) and an unfavorable comparison of foreign currency translation ($2 million). The favorable unit margins were due to benefits from customer agreement pricing gains and spot pricing as well as a more favorable regional mix, with higher sales in North America and lower sales in Asia. Higher rubber blacks fixed costs were primarily associated with the timing of required maintenance costs.

Performance Chemicals

Sales and EBIT for Performance Chemicals for fiscal 2018, 2017 and 2016 are as follows:

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Specialty Carbons and Formulations Sales	$731	$623	$578
Metal Oxides Sales	297	285	287
Performance Chemicals Sales	$1,028	$908	$865
Performance Chemicals EBIT	$200	$201	$225

In fiscal 2018, sales in Performance Chemicals increased by $120 million when compared to fiscal 2017 due to a more favorable price and product mix (combined $36 million), higher volumes ($52 million) and the favorable comparison from foreign currency translation ($33 million). The higher volumes were driven by the acquisition of Tech Blend, which led to higher volumes in the Specialty Carbons and Formulations business. The more favorable price and product mix is primarily due to improved mix and price increases in excess of rising feedstock costs within the Specialty Carbons and Formulations business.

In fiscal 2017, sales in Performance Chemicals increased by $43 million when compared to fiscal 2016 primarily due to higher volumes across all product lines ($51 million) and a favorable price and product mix (combined $2 million), partially offset by an unfavorable comparison of foreign currency translation ($11 million). The higher volumes were mainly driven by growth in sales in Asia and North America.

In fiscal 2018, EBIT in Performance Chemicals was $1 million lower than in fiscal 2017. Higher volumes ($21 million), higher unit margins ($13 million) and the favorable impact of foreign currency translation ($8 million) were fully offset by higher fixed costs ($42 million) and the unfavorable impact from inventory changes ($1 million). Unit margins improved in fiscal 2018 due to successfully implementing price increases in excess of higher feedstock costs. Higher volumes were primarily due to growth in Specialty Compounds which includes the acquisition of Tech Blend during fiscal 2018. The increase in fixed costs was due to several factors: (i) higher sales volumes, which led to higher costs in areas such as warehousing and shipping; (ii) costs associated with the construction of new manufacturing facilities in the fumed metal oxides business in North America and China that are not yet operational; (iii) higher maintenance costs to ensure asset reliability as our volumes grow; and (iv) higher commercial and technology investment to drive business and new product growth.

In fiscal 2017, EBIT in Performance Chemicals decreased by $24 million when compared to fiscal 2016 due to lower unit margins ($33 million), higher fixed costs ($23 million) and the unfavorable impact of foreign currency translation ($2 million). The decrease in unit margins was driven by higher raw material costs. Higher fixed costs were a result of increased maintenance, higher activity levels and growth investments. These decreases in EBIT were partially offset by higher volumes ($32 million) and the favorable impact from changing inventory levels ($2 million). The increase in volumes were primarily driven by growth across all Performance Chemicals product lines during fiscal 2017 with increases in volumes from Asia, North America and Europe.

Purification Solutions

Sales and EBIT for Purification Solutions for fiscal 2018, 2017 and 2016 are as follows:

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Purification Solutions Sales	$279	$281	$290
Purification Solutions EBIT	$(7)	$6	$(5)

Sales in Purification Solutions decreased by $2 million in fiscal 2018 when compared to fiscal 2017 primarily due to lower volumes ($9 million) and a less favorable price and product mix (combined $2 million), partially offset by the favorable impact of foreign currency translation ($9 million). The lower volumes were due to increased competition, customer curtailments and reduced usage in the mercury removal application.

Sales in Purification Solutions decreased by $9 million in fiscal 2017 when compared to fiscal 2016 due to a less favorable price and product mix (combined $16 million) and an unfavorable comparison of foreign currency translation ($1 million), partially offset by higher volumes ($8 million). The less favorable price and product mix was primarily due to price competition in North America for powder activated carbon and weaker mix in specialty applications. The increase in volumes during fiscal 2017 was primarily due to volume growth within mercury removal and specialty applications.

EBIT in Purification Solutions decreased by $13 million in fiscal 2018 when compared to fiscal 2017 driven by lower unit margins ($11 million), lower volumes ($5 million), the unfavorable impact of changing inventory levels ($7 million) and the unfavorable impact of foreign currency translation ($1 million), partially offset by lower fixed costs ($12 million). Lower margins were due to increased competitive intensity in mercury removal and other North American powdered activated carbon applications. Lower fixed costs were due to the savings associated with restructuring actions put in effect during the first quarter of fiscal 2018 and the lower depreciation and amortization expense from recording an impairment during the second quarter of fiscal 2018 as discussed in Note F.

EBIT in Purification Solutions increased by $11 million in fiscal 2017 when compared to fiscal 2016 driven by the favorable impact of changing inventory levels ($15 million), higher volumes ($5 million) and the favorable comparison of foreign currency translation ($2 million). These improvements were partially offset by lower unit margins ($5 million) and higher fixed costs ($6 million). Higher volumes were due to sales to mercury removal and specialty customers. Higher fixed costs were a result of a plant disruption during the third quarter of fiscal 2017 and investment in research and development, marketing and sales resources as we focus on growing the specialty portion of the portfolio.

Specialty Fluids

Sales and EBIT for Specialty Fluids for fiscal 2018, 2017 and 2016 are as follows:

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Specialty Fluids Sales	$45	$ 41	$ 47
Specialty Fluids EBIT	$8	$ 9	$ 13

Sales in Specialty Fluids increased by $4 million in fiscal 2018 when compared to fiscal 2017. The increase was primarily due to a higher level of project activity that resulted in higher rental and sales volumes for our drilling fluids.

Sales in Specialty Fluids decreased by $6 million in fiscal 2017 when compared to fiscal 2016. The decrease was primarily due to lower volumes ($9 million) from lower project activity levels that resulted in lower rental and sales volumes for our drilling fluids. The decrease in volumes was partially offset by a more favorable price and product mix (combined $2 million).

EBIT in Specialty Fluids decreased by $1 million in fiscal 2018 when compared to fiscal 2017. The decrease is primarily due to higher fixed costs ($1 million).

EBIT in Specialty Fluids decreased by $4 million in fiscal 2017 when compared to fiscal 2016. The decrease was primarily due to lower volumes ($6 million), which was partially offset by an improved price and product mix ($2 million).

Outlook

Looking forward to fiscal 2019, we believe favorable industry dynamics and Cabot’s leadership positions will enable another year of strong growth. There are some near term uncertainties, largely related to trade tariffs between the U.S. and China, volatile commodity prices and new emission testing standards in Europe that are causing disruptions in auto production. These uncertainties are driving certain customers to be cautious in their short-term purchasing behavior, but we do not expect this to have a long-term impact on the business. We continue to expect EBIT growth across all segments in fiscal 2019. Reinforcement Materials is expected to benefit from favorable calendar 2019 customer agreements and our strong market position in Asia. We anticipate that Performance Chemicals EBIT will improve as we move through the year and we begin to see the anticipated benefits of our recent growth investments in the second half of fiscal 2019. We expect that Purification Solutions will benefit from a targeted improvement plan we are implementing to focus our portfolio, optimize our assets and streamline the organizational structure to support the new focus. In addition, we will continue to explore strategic alternatives for our Purification Solutions business. We anticipate that Specialty Fluids will continue its recent strong performance into fiscal 2019.

Cash Flows and Liquidity

Overview

Our liquidity position, as measured by cash and cash equivalents plus borrowing availability, decreased by $354 million during fiscal 2018. The decrease was primarily attributable to increased commercial paper borrowings, which reduced our borrowing availability under our revolving credit agreement, and a decrease in our cash balances. As of September 30, 2018, we had cash and cash equivalents of $175 million and borrowing availability under our revolving credit agreement of $751 million. Our revolving credit agreement, which was amended in October 2017 to extend the maturity to October 2022, supports our commercial paper program and may be used for working capital, letters of credit and other general corporate purposes.

At September 30, 2018, we were in compliance with all applicable covenants under our revolving credit facility including the total consolidated debt to consolidated EBITDA (earnings before interest, taxes, depreciation and amortization) covenant.

A significant portion of our business occurs outside the U.S. and our cash generation does not always align geographically with our cash needs. The vast majority of our cash and cash equivalent holdings tend to be held outside the U.S. Cash held by foreign subsidiaries is generally used to finance the subsidiaries' operational activities and future investments. We use commercial paper throughout the year to manage short term U.S. cash needs. The commercial paper balance is generally reduced at quarter-end using cash derived from customer collections, settlement of intercompany balances and short-term intercompany loans. The balance of commercial paper outstanding as of September 30, 2018 was $249 million. If additional funds are needed in the U.S., we can repatriate offshore earnings.

We generally manage our cash and debt on a global basis to provide for working capital requirements as needed by region or site. Cash and debt are generally denominated in the local currency of the subsidiary holding the assets or liabilities, except where there are operational cash flow reasons to hold non-functional currency or debt.

We anticipate sufficient liquidity from (i) cash on hand; (ii) cash flows from operating activities; and (iii) cash available from our revolving credit agreement and our commercial paper program to meet our operational and capital investment needs and financial obligations for the foreseeable future. The liquidity we derive from cash flows from operations is, to a large degree, predicated on our ability to collect our receivables in a timely manner, the cost of our raw materials, and our ability to manage inventory levels.

We issued $30 million of 7.42% medium term notes in fiscal 1999 that mature on December 11, 2018 and are included in Current portion of long-term debt on the Consolidated Balance Sheets as of September 30, 2018. We intend to pay off these notes at maturity with cash on hand and/or commercial paper borrowings.

In November 2013, we purchased all of our joint venture partner's common stock in the former NHUMO, S.A. de C.V. ("NHUMO") joint venture. At the close of the transaction, NHUMO issued redeemable preferred stock to the joint venture partner with a repurchase value of $25 million and a fixed dividend rate of 6% per annum. In November 2018, we repurchased the preferred stock for $25 million and paid a final dividend payment of approximately $1.4 million.

The following discussion of the changes in our cash balance refers to the various sections of our Consolidated Statements of Cash Flows.

Cash Flows from Operating Activities

Cash provided by operating activities, which consists of net income adjusted for the various non-cash items included in income, changes in working capital and changes in certain other balance sheet accounts, totaled $298 million in fiscal 2018. Operating activities provided $348 million and $392 million in fiscal 2017 and in fiscal 2016, respectively.

Cash provided by operating activities in fiscal 2018 was driven primarily by net income, which, before non-cash depreciation, amortization and impairment charges, totaled $329 million from strong business performance and an increase in accounts payable and accrued liabilities, partially offset by increases in Accounts and notes receivable and Inventories largely driven by higher raw material costs.

Cash provided by operating activities in fiscal 2017 was driven primarily by net income of $273 million plus $155 million of non-cash depreciation and amortization. In addition, there was an increase in accounts payable and accruals and dividends from equity affiliates. These sources of cash were partially offset by increases in accounts receivable and inventories due to higher sales and raw material costs.

Cash provided by operating activities in fiscal 2016 was driven primarily by net income of $162 million plus $161 million of non-cash depreciation and amortization. In addition, there was a net decrease in accounts receivable and inventories largely driven by lower raw material costs and associated price reductions. These sources of cash were partially offset by a decrease in accounts payable.

In addition to the factors noted above, the following other elements of operations have a bearing on operating cash flows:

Restructurings — As of September 30, 2018, we had $5 million of total restructuring costs in accrued expenses in the Consolidated Balance Sheets related to our global restructuring activities. We made cash payments of $5 million during fiscal 2018 and received cash payments of $39 million related to the sale of land at our former sites in Thane, India and Merak, Indonesia. In fiscal 2019 and thereafter, we expect to make cash payments totaling approximately $5 million related to these restructuring plans.

Environmental Reserves and Litigation Matters—As of September 30, 2018, we had a $15 million reserve for environmental remediation costs at various sites. These sites are primarily associated with businesses divested in prior years. Additionally, as of September 30, 2018, we had a $25 million reserve for respirator claims. Expenditures for each of these reserves will be incurred over many years. We also have other litigation costs arising in the ordinary course of business.

Cash Flows from Investing Activities

In fiscal 2018, investing activities consumed $246 million, which was primarily driven by $64 million of cash paid for our Specialty Compounds acquisition of Tech Blend, net of cash acquired of $1 million, and capital expenditures of $229 million. These capital expenditures were for sustaining and compliance capital projects at our operating facilities as well as capacity expansion capital expenditures in Reinforcement Materials and Performance Chemicals. Offsetting these amounts was an inflow of cash related to the sales of land at our former sites in Merak, Indonesia, and Thane, India and proceeds from the sale of shares of a cost method investment in Asia. In fiscal 2017, capital expenditures were $147 million. Capital expenditures were primarily related to sustaining and compliance capital projects at our operating facilities. In fiscal 2016, capital expenditures were $112 million. Major capital project expenditures were related to sustaining and compliance activities.

Capital expenditures for fiscal 2019 are expected to be between $250 million and $300 million. Our planned capital spending program for fiscal 2019 is primarily for sustaining, compliance and improvement capital projects at our operating facilities as well as capacity expansion capital expenditures in Reinforcement Materials and Performance Chemicals.

Cash Flows from Financing Activities

Financing activities consumed $141 million of cash in fiscal 2018 compared to $133 million in fiscal 2017 and $184 million in fiscal 2016. The use of cash in fiscal 2018 was primarily related to cash dividends paid to common stockholders of $80 million, purchases of common stock of $142 million, and cash dividends paid to noncontrolling interests of $21 million. This was offset by an increase in our overall debt balance of $80 million. The increase in debt was driven primarily by an increase in working capital and the acquisition of Tech Blend, partially offset by the proceeds from the Merak, Indonesia and Thane, India land sales.

The use of cash in fiscal 2017 was primarily related to cash dividends paid to common stockholders of $77 million, purchases of common stock of $61 million, and cash dividends paid to noncontrolling interests of $14 million. Partially offsetting these uses of cash was $21 million of proceeds from the exercise of stock options granted under our incentive compensation plans.

The use of cash in fiscal 2016 was primarily related to cash dividends paid to common stockholders of $65 million, purchases of common stock of $45 million, cash dividends paid to noncontrolling interests of $16 million, and a decrease in our overall debt balance of $68 million. The decrease in debt was driven primarily by our redemption of our $300 million 5% fixed rate debt and a reduction in our outstanding commercial paper, partially offset by the issuance of $250 million in registered notes with a coupon of 3.4% that mature on September 15, 2026.

At September 30, 2018, we had $751 million of availability under our credit agreement. Although generally we have an outstanding commercial paper balance during the quarter, we generally reduce the balance at quarter-end through cash receipts from collections, settlement of intercompany balances and short-term intercompany loans. There was $249 million of commercial paper outstanding at September 30, 2018. There was no commercial paper outstanding at September 30, 2017.

Our long-term total debt, of which $35 million is current, matures at various times as presented in Note I of our Notes to the Consolidated Financial Statements. The weighted-average interest rate on our fixed rate long-term debt was 3.5% as of September 30, 2018.

Share Repurchases

In July 2018, the Board of Directors' authorized us to repurchase up to an additional 10 million shares of common stock. During fiscal 2018, 2017, and 2016, we repurchased approximately 2.2 million, 1.1 million, and 0.8 million shares of our common stock on the open market for $138 million, $59 million, and $39 million, respectively. Additionally, during fiscal 2018, 2017, and 2016, we repurchased less than one million shares of our common stock in each year associated with employee tax obligations on stock based compensation awards for $4 million, $2 million and $6 million, respectively. As of September 30, 2018, we had approximately 9.5 million shares available for repurchase under the Board of Directors' share repurchase authorization.

Dividend Payments

In fiscal 2018, 2017 and 2016, we paid cash dividends on our common stock of $1.29, $1.23 and $1.04 per share, respectively. These cash dividend payments totaled $80 million in fiscal 2018, $77 million in fiscal 2017, and $65 million in fiscal 2016.

Employee Benefit Plans

As of September 30, 2018, we had a consolidated pension obligation, net of the fair value of plan assets, of $92 million, comprised of $44 million for pension benefit plan liabilities and $48 million for postretirement benefit plan liabilities.

The $44 million of unfunded pension benefit plan liabilities is derived as follows:

	U.S.	Foreign	Total
	(In millions)		
Fair Value of Plan Assets	$149	$ 323	$472
Benefit Obligation	143	373	516
Funded (Unfunded) Status	$6	$ (50)	$(44)

In fiscal 2018, we made cash contributions totaling approximately $9 million to our foreign pension benefit plans. In fiscal 2019, we expect to make cash contributions of $8 million to our foreign pension plans.

The $48 million of unfunded postretirement benefit plan liabilities is comprised of $29 million for our U.S. and $19 million for our foreign postretirement benefit plans. These postretirement benefit plans provide certain health care and life insurance benefits for retired employees. Typical of such plans, our postretirement plans are unfunded and, therefore, have no plan assets. We fund these plans as claims or insurance premiums come due. In fiscal 2018, we paid postretirement benefits of $3 million under our U.S. postretirement plans and $1 million under our foreign postretirement plans. For fiscal 2019, our benefit payments for our postretirement plans are expected to be $4 million.

Off-Balance Sheet Arrangements

As of September 30, 2018, we had no material transactions that meet the definition of an off-balance sheet arrangement.

Contractual Obligations

The following table sets forth our long-term contractual obligations.

	Payments Due by Fiscal Year						
	2019	2020	2021	2022	2023	Thereafter	Total
	(In millions)						
Purchase Commitments	$454	$297	$200	$195	$164	$ 2,168	$3,478
Long-term debt	34	—	90	365	—	258	747
Capital lease obligations(1)	1	2	2	2	2	8	17
Fixed interest on long-term debt	29	23	23	20	9	28	132
Operating leases	22	13	10	9	9	69	132
Total	$540	$335	$325	$591	$184	$ 2,531	$4,506

(1) Capital lease obligations include interest.

Purchase Commitments

We have entered into long-term, volume-based purchase agreements primarily for the purchase of raw materials and natural gas with various key suppliers for all of our business segments. Under certain of these agreements the quantity of material being purchased is fixed, but the price we pay changes as market prices change. For purposes of the table above, current purchase prices have been used to quantify total commitments. We have also entered into long-term purchase agreements primarily for services related to information technology, which are not included in the table above, that total $14 million as of September 30, 2018, the majority of which is expected to be paid within the next 5 years.

Capital Leases

We have capital lease obligations primarily for certain equipment and buildings. These obligations are payable over the next 15 years.

Operating Leases

We have operating leases primarily comprised of leases for transportation vehicles, warehouse facilities, office space, and machinery and equipment.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to changes in interest rates and foreign currency exchange rates because we finance certain operations through long- and short-term borrowings and denominate our transactions in a variety of foreign currencies. Changes in these rates may have an impact on future cash flows and earnings. We manage these risks through normal operating and financing activities and, when deemed appropriate, through the use of derivative financial instruments.

We have policies governing our use of derivative instruments, and we do not enter into financial instruments for trading or speculative purposes.

By using derivative instruments, we are subject to credit and market risk. The derivative instruments are booked in our balance sheet at fair value and reflect the asset or liability position as of September 30, 2018. If a counterparty fails to fulfill its performance obligations under a derivative contract, our exposure will equal the fair value of the derivative. Generally, when the fair value of a derivative contract is positive, the counterparty owes Cabot, thus creating a payment risk for Cabot. We minimize counterparty credit or repayment risk by entering into these transactions with major financial institutions of investment grade credit rating. Our exposure to market risk is not hedged in a manner that completely eliminates the effects of changing market conditions on earnings or cash flow.

Foreign Currency Risk

Our international operations are subject to certain risks, including currency exchange rate fluctuations and government actions. We have cross-currency swaps designated as hedges of our net investments in certain Euro denominated subsidiaries. The following table summarizes the principal terms of our cross-currency swaps, including the aggregate notional amount of the swaps, the interest rate payment we receive from and pay to our swap counterparties, the term and fair value at September 30, 2018.

Description	Notional Amount	Interest Rate Received	Interest Rate Paid	Fiscal Year Entered Into	Maturity Year	Fair Value at September 30, 2018
Cross Currency Swaps	USD 250 million swapped to EUR 223 million	3.40%	1.94%	2016	2026	$(18) million

We also have foreign currency exposures arising from the denomination of monetary assets and liabilities in foreign currencies other than the functional currency of a given subsidiary as well as the risk that currency fluctuations could affect the dollar value of future cash flows generated in foreign currencies. Accordingly, we use short-term forward contracts to minimize the exposure to foreign currency risk. At September 30, 2018, we had $18 million in net notional foreign currency contracts, which were denominated in Czech koruna. These forwards had a fair value of less than $1 million as of September 30, 2018.

In certain situations where we have forecasted purchases under a long-term commitment or forecasted sales denominated in a foreign currency we may enter into appropriate financial instruments in accordance with our risk management policy to hedge future cash flow exposures.

The primary currencies for which we have exchange rate exposure are the Euro, Japanese Yen, Brazilian Real, and Argentine Peso. In fiscal year 2018, foreign currency translations in the aggregate increased our business segment EBIT by $20 million, the majority of which affected the results of the Reinforcement Materials and Performance Chemicals segments, partially offset by an unfavorable impact to the Purification Solutions segment. The overall favorable impact was driven by the translation of local currency denominated revenues and costs in Europe, where the U.S dollar weakened, and local currency denominated cost in Argentina, where the U.S. dollar strengthened. In addition, we recognized a $4 million net foreign exchange loss in Other income (expense) in fiscal 2018 from the revaluation of monetary assets and liabilities from transactional currencies to functional currency, largely attributable to changes in the value of the Brazilian Real and Indonesian Rupiah, offset by gains from movement in the Argentine Peso during the year. Effective July 1, 2018, we began to account for our Argentina carbon black operating entity as operating in a hyperinflationary economy and the operating entity began using our reporting currency, the U.S. dollar, as its functional currency. Included in the $4 million net foreign exchange loss is a $3 million net foreign exchange gain, which reflects the remeasurement of the Argentina operating entity’s net monetary liabilities denominated in Argentine peso. Refer to Note L of our Notes to the Consolidated Financial Statements for additional details regarding Argentina hyperinflation.

Item 8. Financial Statements and Supplementary Data

INDEX TO FINANCIAL STATEMENTS

CABOT CORPORATION

CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended September 30		
	2018	2017	2016
	(In millions, except per share amounts)		
Net sales and other operating revenues	$3,242	$2,717	$2,411
Cost of sales	2,461	2,054	1,836
Gross profit	781	663	575
Selling and administrative expenses	305	260	275
Research and technical expenses	66	56	53
Purification Solutions long-lived assets impairment charge (Note F)	162	—	—
Purification Solutions goodwill impairment charge (Note F)	92	—	—
Income (loss) from operations	156	347	247
Interest and dividend income	10	9	5
Interest expense	(54)	(53)	(54)
Other income (expense)	5	(4)	(7)
Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies	117	299	191
(Provision) benefit for income taxes	(193)	(33)	(33)
Equity in earnings of affiliated companies, net of tax	2	7	3
Income (loss) from continuing operations	(74)	273	161
Income (loss) from discontinued operations, net of tax of $—, $— and $1	—	—	1
Net income (loss)	(74)	273	162
Net income (loss) attributable to noncontrolling interests, net of tax of $10, $6 and $4	39	25	15
Net income (loss) attributable to Cabot Corporation	$(113)	$248	$147
Weighted-average common shares outstanding:			
Basic	61.7	62.3	62.4
Diluted	61.7	62.7	62.9
Earnings per common share:			
Basic:			
Income (loss) from continuing operations attributable to Cabot Corporation	$(1.85)	$3.94	$2.32
Income (loss) from discontinued operations	—	—	0.02
Net income (loss) attributable to Cabot Corporation	$(1.85)	$3.94	$2.34
Diluted:			
Income (loss) from continuing operations attributable to Cabot Corporation	$(1.85)	$3.91	$2.30
Income (loss) from discontinued operations	—	—	0.02

Net income (loss) attributable to Cabot Corporation	$(1.85)	$3.91	$2.32
Dividends per common share	$1.29	$1.23	$1.04

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

CABOT CORPORATION

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Net income (loss)	$(74)	$273	$162
Other comprehensive income (loss), net of tax			
Foreign currency translation adjustment, net of tax (provision) benefit of $1, $4, and $—	(64)	25	7
Unrealized holding gains (losses) arising during the period, net of tax provision of $—, $—, and $—	(1)	—	—
Derivatives: net investment hedges			
(Gains) losses reclassified to interest expense, net of tax provision (benefit) of $2, $—, and $—	(3)	—	—
(Gains) losses excluded from effectiveness testing and amortized to interest expense, net of tax provision (benefit) of $(1), $—, and $—	1	—	—
Pension and other postretirement benefit liability adjustments			
Pension and other postretirement benefit liability adjustments arising during the period, net of tax	6	41	(38)
Amortization of net loss and prior service credit included in net periodic pension cost, net of tax	(1)	2	—
Other comprehensive income (loss)	(62)	68	(31)
Comprehensive income (loss)	(136)	341	131
Net income (loss) attributable to noncontrolling interests, net of tax	39	25	15
Foreign currency translation adjustment attributable to noncontrolling interests, net of tax	(4)	2	(5)
Comprehensive income (loss) attributable to noncontrolling interests	35	27	10
Comprehensive income (loss) attributable to Cabot Corporation	$(171)	$314	$121

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

CABOT CORPORATION

CONSOLIDATED BALANCE SHEETS

ASSETS

	September 30 2018	2017
	(In millions, except share and per share amounts)	
Current assets:		
Cash and cash equivalents	$175	$280
Accounts and notes receivable, net of reserve for doubtful accounts of $7 and $9	637	527
Inventories	511	433
Prepaid expenses and other current assets	63	59
Total current assets	1,386	1,299
Property, plant and equipment	3,520	3,602
Accumulated depreciation	(2,224)	(2,297)
Net property, plant and equipment	1,296	1,305
Goodwill	93	154
Equity affiliates	52	56
Intangible assets, net	98	137
Assets held for rent	118	104
Deferred income taxes	134	237
Other assets	67	46
Total assets	$3,244	$3,338

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

CABOT CORPORATION

CONSOLIDATED BALANCE SHEETS

LIABILITIES AND STOCKHOLDERS' EQUITY

	September 30	
	2018	2017
	(In millions, except share and per share amounts)	
Current liabilities:		
Short-term borrowings	$249	$7
Accounts payable and accrued liabilities	613	457
Income taxes payable	29	22
Current portion of long-term debt	35	256
Redeemable preferred stock	26	—
Total current liabilities	952	742
Long-term debt	719	661
Deferred income taxes	42	38
Other liabilities	252	245
Redeemable preferred stock	—	27
Commitments and contingencies (Note S)		
Stockholders' equity:		
Preferred stock:		
Authorized: 2,000,000 shares of $1 par value		
Issued and Outstanding: None and none	—	—
Common stock:		
Authorized: 200,000,000 shares of $1 par value		
Issued: 60,566,375 and 62,087,627 shares		
Outstanding 60,366,569 and 61,884,347 shares	61	62
Less cost of 199,806 and 203,280 shares of common treasury stock	(7)	(6)
Additional paid-in capital	—	—
Retained earnings	1,417	1,707
Accumulated other comprehensive income (loss)	(317)	(259)
Total Cabot Corporation stockholders' equity	1,154	1,504
Noncontrolling interests	125	121
Total stockholders' equity	1,279	1,625
Total liabilities and stockholders' equity	$3,244	$3,338

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

CABOT CORPORATION

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended September 30		
	2018	2017	2016
	(In millions)		
Cash Flows from Operating Activities:			
Net income (loss)	$(74)	$273	$162
Adjustments to reconcile net income (loss) to cash provided by operating activities:			
Depreciation and amortization	149	155	161
Long-lived asset impairment charge	162	—	23
Goodwill impairment charge	92	—	—
Deferred tax provision (benefit)	91	(31)	(36)
Gain on sale of land	(39)	—	—
Gain on sale of investments	(10)	—	—
Equity in net income of affiliated companies	(2)	(7)	(3)
Non-cash compensation	22	16	17
Other non-cash (income) expense	16	(3)	5
Changes in assets and liabilities:			
Accounts and notes receivable	(127)	(64)	25
Inventories	(105)	(61)	54
Prepaid expenses and other current assets	(27)	(14)	1
Accounts payable and accrued liabilities	122	91	(27)
Income taxes payable	7	(2)	(4)
Other liabilities	12	(16)	5
Cash dividends received from equity affiliates	9	11	9
Cash provided by operating activities	298	348	392
Cash Flows from Investing Activities:			
Additions to property, plant and equipment	(229)	(147)	(112)
Proceeds from the sale of land	39	—	16
Change in assets held for rent	(3)	(6)	(8)
Cash paid for acquisition of business, net of cash acquired of $1, $— and $—	(64)	—	—
Proceeds from sales of investments	11	—	—
Other	—	4	—
Cash used in investing activities	(246)	(149)	(104)
Cash Flows from Financing Activities:			
Borrowings under financing arrangements	—	1	—
Repayments under financing arrangements	(4)	(3)	(3)
Increase in short-term borrowings, net	(4)	2	—
Proceeds (repayments) from issuance of commercial paper, net	249	—	(12)
Proceeds from long-term debt, net of issuance costs	90	—	248
Repayments of long-term debt	(251)	(2)	(301)
Purchases of common stock	(142)	(61)	(45)
Proceeds from sales of common stock	22	21	10
Cash dividends paid to noncontrolling interests	(21)	(14)	(16)

Cash dividends paid to common stockholders	(80)	(77)	(65)
Cash used in financing activities	(141)	(133)	(184)
Effects of exchange rate changes on cash	(16)	14	19
Increase (decrease) in cash and cash equivalents	(105)	80	123
Cash and cash equivalents at beginning of year	280	200	77
Cash and cash equivalents at end of year	$175	$280	$200
Income taxes paid	$84	$69	$66
Interest paid	$47	$48	$51

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

CABOT CORPORATION

CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY

(In millions, except shares in thousands)

	Common Stock, Net of Treasury Stock Shares	Common Stock, Net of Treasury Stock Cost	Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Total Cabot Corporation Stockholders' Equity	Noncontrolling Interests	Total Stockholders' Equity
Balance at September 30, 2015	62,458	$ 55	$ —	$ 1,497	$ (299)	$ 1,253	$ 104	$ 1,357
Net income (loss) attributable to Cabot Corporation				147		147		147
Net income (loss) attributable to noncontrolling interests						—	15	15
Total other comprehensive income (loss)					(26)	(26)	(5)	(31)
Cash dividends paid to noncontrolling interests						—	(16)	(16)
Cash dividends paid to common stockholders				(65)		(65)		(65)
Issuance of stock under equity compensation plans	737	1	9			10		10
Amortization of share-based compensation			17			17		17
Purchase and retirement of common stock	(984)	(1)	(26)	(18)		(45)		(45)
Balance at September 30, 2016	62,211	55	—	1,561	(325)	1,291	98	1,389
Net income (loss) attributable to Cabot Corporation				248		248		248
Net income (loss) attributable to noncontrolling interests							25	25
Total other comprehensive income (loss)					66	66	2	68
Contributions from noncontrolling interest							4	4
Acquisition of noncontrolling interest			(6)			(6)	6	—
Cash dividends paid to noncontrolling interests							(14)	(14)
Cash dividends paid to common stockholders				(77)		(77)		(77)
Issuance of stock under equity compensation plans	833	2	25			27		27
Amortization of share-based compensation			16			16		16
	(1,160)	(1)	(35)	(25)		(61)		(61)

Purchase and retirement of common stock								
Balance at September 30, 2017	61,884	56	—	1,707	(259)	1,504	121	1,625
Net income (loss) attributable to Cabot Corporation				(113)		(113)		(113)
Net income (loss) attributable to noncontrolling interests							39	39
Total other comprehensive income (loss)					(58)	(58)	(4)	(62)
Acquisition of noncontrolling interest			(1)			(1)	1	—
Cash dividends declared to noncontrolling interests			—			—	(32)	(32)
Cash dividends paid to common stockholders				(80)		(80)		(80)
Issuance of stock under equity compensation plans	733	—	22			22		22
Amortization of share-based compensation			22			22		22
Purchase and retirement of common stock	(2,250)	(2)	(43)	(97)		(142)		(142)
Balance at September 30, 2018	60,367	$ 54	$ —	$ 1,417	$ (317)	$ 1,154	$ 125	$ 1,279

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

Notes to the Consolidated Financial Statements

Note A. Significant Accounting Policies

The consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States ("U.S."). The significant accounting policies of Cabot Corporation ("Cabot" or "the Company") are described below.

Unless otherwise indicated, all disclosures and amounts in the Notes to the Consolidated Financial Statements relate to the Company's continuing operations.

Effective October 1, 2017, the Company changed its method of accounting for its U.S. carbon black inventories from the last-in, first-out ("LIFO") method to the first-in, first-out ("FIFO") method. The Company applied this change retrospectively to all prior periods presented, which is discussed in further detail under the heading "Inventories" below.

As discussed in Note C, in fiscal 2018, the Company acquired 8755329 Canada Inc. ("Tech Blend") and acquired NSCC Carbon (Jiangsu) Co. Ltd. ("NSCC Carbon"). The financial position, results of operations and cash flows of Tech Blend and NSCC Carbon are included in the Company's consolidated financial statements from the date of acquisition.

Principles of Consolidation

The consolidated financial statements include the accounts of Cabot and its wholly-owned subsidiaries and majority-owned and controlled U.S. and non-U.S. subsidiaries. Additionally, Cabot considers consolidation of entities over which control is achieved through means other than voting rights, of which there were none in the periods presented. Intercompany transactions have been eliminated in consolidation.

Cash and Cash Equivalents

Cash equivalents include all highly liquid investments with a maturity of three months or less at date of acquisition. Cabot continually assesses the liquidity of cash equivalents and, as of September 30, 2018, has determined that they are readily convertible to cash.

Inventories

Inventories are stated at the lower of cost or market. Effective October 1, 2017, the Company changed its method of accounting for its U.S. carbon black inventories from the LIFO method to the FIFO method. Total U.S. inventories accounted for utilizing the LIFO cost flow assumption represented 7% of the Company's total worldwide inventories as of September 30, 2017. The Company believes the FIFO method is preferable because it: (i) conforms the accounting for U.S. carbon black inventories to the Company's inventory valuation methodology for the majority of its other inventories; (ii) better represents how management assesses and reports on the performance of the Reinforcement Materials and Performance Chemicals operating segments that carry the Company's U.S. carbon black inventories, as the impact of accounting for this inventory on a LIFO basis has historically been excluded from segment results; (iii) better aligns the accounting for U.S. carbon black inventories with the physical flow of that inventory; and (iv) improves comparability with many of the Company's peers.

The Company applied this change retrospectively to all prior periods presented. This change resulted in a $19 million increase in retained earnings as of October 1, 2015, from $1,478 million to $1,497 million. In addition, the following financial statement line items in the Company's Consolidated Statements of Operations for the years ended September 30, 2017 and 2016, its Consolidated Balance Sheets as of September 30, 2017 and 2016, and its Consolidated Statements of Cash Flows for the years ended September 30, 2017 and 2016 were adjusted:

Consolidated Statements of Operations	Years Ended September 30					
	2017			2016		
	As Originally Reported	Effect of Change	As Adjusted	As Originally Reported	Effect of Change	As Adjusted
	(In millions, except per share amounts)					
Cost of sales	$2,065	$(11)	$2,054	$1,833	$3	$1,836
Income (loss) from continuing operations before income taxes and equity in earnings of affiliated companies	$288	$11	$299	$194	$(3)	$191
(Provision) benefit for income taxes	$(29)	$(4)	$(33)	$(34)	$1	$(33)
Net income (loss)	$266	$7	$273	$164	$(2)	$162
Net income (loss) attributable to Cabot Corporation	$241	$7	$248	$149	$(2)	$147
Earnings per common share:						
Basic	$3.83	$0.11	$3.94	$2.38	$(0.04)	$2.34
Diluted	$3.80	$0.11	$3.91	$2.36	$(0.04)	$2.32

Consolidated Balance Sheets	September 30, 2017			September 30, 2016		
	As Originally Reported	Effect of Change	As Adjusted	As Originally Reported	Effect of Change	As Adjusted
	(In millions)			(In millions)		
Inventories	$396	$37	$433	$342	$26	$368
Deferred income taxes (assets)	$250	$(13)	$237	$216	$(9)	$207
Retained earnings	$1,683	$24	$1,707	$1,544	$17	$1,561

Consolidated Statements of Cash Flows	Years Ended September 30					
	2017			2016		
	As Originally Reported	Effect of Change	As Adjusted	As Originally Reported	Effect of Change	As Adjusted
	(In millions)					
Net income (loss)	$266	$7	$273	$164	$(2)	$162
Deferred tax provision (benefit)	$(35)	$4	$(31)	$(35)	$(1)	$(36)
Inventories	$(50)	$(11)	$(61)	$51	$3	$54

If the Company had continued to account for its U.S. carbon black inventories under LIFO, there would have been an increase in Cost of Sales of $15 million, an additional benefit to the (Provision) benefit for income taxes of $4 million, an impact to the Net income (loss) attributable to Cabot Corporation of $11 million, and a decrease of $0.19 in both basic and diluted earnings per common share in the Consolidated Statements of Operations for the year ended September 30, 2018. The impact to the Consolidated Balance Sheets as of September 30, 2018 would have been a decrease of $52 million in Inventories, an increase of $17 million in Deferred income taxes (assets), and a decrease of $35 million in Retained earnings.

The cost of Specialty Fluids inventories that are classified as inventory and assets held for rent is determined using the average cost method. The cost of all other inventories is determined using the FIFO method.

Cabot periodically reviews inventory for both potential obsolescence and potential declines in anticipated selling prices. In this review, the Company makes assumptions about the future demand for and market value of the inventory, and based on these assumptions estimates the amount of any obsolete, unmarketable, slow moving, or overvalued inventory. Cabot writes down the value of these inventories by an amount equal to the difference between the cost of the inventory and its estimated net realizable value.

Investments

The Company has investments in equity affiliates and marketable securities. As circumstances warrant, all investments are subject to periodic impairment reviews. Unless consolidation is required, investments in equity affiliates, where Cabot generally owns between 20% and 50% of the affiliate, are accounted for using the equity method. Cabot records its share of the equity affiliate's results of operations based on its percentage of ownership of the affiliate. Dividends declared from equity affiliates are a return on investment and are recorded as a reduction to the equity investment value. At September 30, 2018 and 2017, Cabot had equity affiliate investments of $52 million and $56 million, respectively. Dividends declared and received from these investments were $9 million, $11 million and $9 million in fiscal 2018, 2017 and 2016, respectively.

Intangible Assets and Goodwill Impairment

The Company records tangible and intangible assets acquired and liabilities assumed in business combinations under the acquisition method of accounting. Amounts paid for an acquisition are allocated to the assets acquired and liabilities assumed based on their fair values at the date of acquisition. The Company uses assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets requires the use of significant judgment with regard to assumptions used in the valuation model. The Company estimates the fair value of identifiable acquisition-related intangible assets principally based on projections of cash flows that will arise from these assets. The projected cash flows are discounted to determine the fair value of the assets at the dates of acquisition. The Company acquired Tech Blend in November 2017, which included separately identifiable intangible assets of $29 million as part of the purchase price allocation as discussed in Note C.

Definite-lived intangible assets, which are comprised of trademarks, customer relationships and developed technologies, are amortized over their estimated useful lives and are reviewed for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. The Company recognized an impairment on intangible assets associated with the Purification Solutions business in second fiscal quarter of 2018, which is discussed in Note F.

Goodwill is comprised of the purchase price of business acquisitions in excess of the fair value assigned to the net tangible and identifiable intangible assets acquired. Goodwill is not amortized, but is reviewed for impairment annually as of May 31, or when events or changes in the business environment indicate that the carrying value of the reporting unit may exceed its fair value. A reporting unit, for the purpose of the impairment test, is at or below the operating segment level, and constitutes a business for which discrete financial information is available and regularly reviewed by segment management. Reinforcement Materials, and the Fumed Metal Oxides and Specialty Compounds businesses within Performance Chemicals, which are considered separate reporting units, carried the Company's goodwill balances as of May 31, 2018. The Purification Solutions reporting unit had no remaining goodwill balance subsequent to the goodwill impairment charge recorded in the second quarter of fiscal 2018. As part of the Tech Blend acquisition, goodwill of $33 million was generated and is reflected in the Specialty Compounds reporting unit.

For the purpose of the goodwill impairment test, the Company first assesses qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If an initial qualitative assessment identifies that it is more likely than not that the carrying value of a reporting unit exceeds its estimated fair value, an additional quantitative evaluation is performed. Alternatively, the Company may elect to proceed directly to the quantitative goodwill impairment test. If based on the quantitative evaluation the fair value of the reporting unit is less than its carrying amount, a goodwill impairment loss would result. The goodwill impairment loss would be the amount by which the carrying value of the reporting unit, including goodwill, exceeds its fair value, limited to the total amount of goodwill allocated to that reporting unit. The fair value of a reporting unit is based on discounted estimated future cash flows. The fair value is also benchmarked against a market approach using the guideline public companies method. The assumptions used to estimate fair value include management's best estimates of future growth rates, operating cash flows, capital expenditures and discount rates over an estimate of the remaining operating period at the reporting unit level. Refer to Note F and Note G for details on the Purification Solutions goodwill impairment test and the resulting charge recorded in the second quarter of fiscal 2018, and the results of the Company’s annual goodwill impairment test performed as of May 31, 2018, respectively.

Long-lived Assets Impairment

The Company’s long-lived assets primarily include property, plant and equipment, intangible assets, long-term investments and assets held for rent. The carrying values of long-lived assets are reviewed for impairment whenever events or changes in business circumstances indicate that the carrying amount of an asset may not be recoverable.

To test for impairment of assets, the Company generally uses a probability-weighted estimate of the future undiscounted net cash flows of the assets over their remaining lives to determine if the value of the asset is recoverable. Long-lived assets are grouped with other assets and liabilities at the lowest level for which independent identifiable cash flows are determinable.

An asset impairment is recognized when the carrying value of the asset is not recoverable based on the analysis described above, in which case the asset is written down to its fair value. If the asset does not have a readily determinable market value, a discounted cash flow model may be used to determine the fair value of the asset. In circumstances when an asset does not have separate identifiable cash flows, an impairment charge is recorded when the Company no longer intends to use the asset. In the second quarter of fiscal 2018, the Company determined that the long-lived asset group of Purification Solutions was not fully recoverable, and accordingly, the Company recorded an impairment charge for the carrying value in excess of the fair value of the asset group, as described in Note F.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. Depreciation of property, plant and equipment is calculated using the straight-line method over the estimated useful lives of the related assets. The depreciable lives for buildings, machinery and equipment, and other fixed assets are generally between twenty and twenty-five years, ten and twenty-five years, and three and twenty-five years, respectively. The cost and accumulated depreciation for property, plant and equipment sold, retired, or otherwise disposed of are removed from the Consolidated Balance Sheets and resulting gains or losses are included in earnings in the Consolidated Statements of Operations. Expenditures for repairs and maintenance are charged to expenses as incurred. Expenditures for major renewals and betterments, which significantly extend the useful lives of existing plant and equipment, are capitalized and depreciated.

Non-cash capital expenditures for significant projects was approximately $29 million and $7 million for the years ended September 30, 2018 and 2017, respectively, and was included in Accounts payable and accrued liabilities in the Consolidated Balance Sheets.

Cabot capitalizes interest costs when they are part of the historical cost of acquiring and constructing certain assets that require a period of time to prepare for their intended use. During fiscal 2018, 2017 and 2016, Cabot capitalized $2 million, $1 million and $1 million of interest costs, respectively. These amounts are amortized over the lives of the related assets when they are placed in service.

Assets Held for Rent

Assets held for rent represent Specialty Fluids cesium formate product that is available to customers in the normal course of business. At both September 30, 2018 and 2017, $5 million of cesium ore was included in assets held for rent, a majority of which will be converted into cesium formate. Assets held for rent are stated at average cost.

Asset Retirement Obligations

Cabot estimates incremental costs for special handling, removal and disposal of materials that may or will give rise to conditional asset retirement obligations (“ARO”) and then discounts the expected costs back to the current year using a credit adjusted risk free rate. Cabot recognizes ARO liabilities and costs when the timing and/or settlement can be reasonably estimated. In certain instances, Cabot has not recorded a reserve for AROs because of the indefinite life of certain assets. The ARO reserves were $28 million and $26 million at September 30, 2018 and 2017, respectively, and are included in Accounts payable and accrued liabilities and Other liabilities on the Consolidated Balance Sheets.

Foreign Currency Translation

The functional currency of the majority of Cabot’s foreign subsidiaries is the local currency in which the subsidiary operates. Assets and liabilities of foreign subsidiaries are translated into U.S. dollars at exchange rates in effect at the balance sheet dates. Income and expense items are translated at average monthly exchange rates during the year. Unrealized currency translation adjustments are included as a separate component of Accumulated other comprehensive income (loss) (“AOCI”) within stockholders’ equity.

Realized and unrealized foreign currency gains and losses arising from transactions denominated in currencies other than the subsidiary's functional currency are reflected in earnings with the exception of (i) intercompany transactions considered to be of a long-term investment nature; (ii) income taxes upon future repatriation of unremitted earnings from non-U.S. subsidiaries that are not indefinitely reinvested; and (iii) foreign currency borrowings designated as net investment hedges. Gains or losses arising from these transactions are included as a component of Other comprehensive income (loss). In fiscal 2018, 2017 and 2016, net foreign currency transaction losses of $4 million, $4 million, and $7 million, respectively, are included in Other income (expense) in the Consolidated Statements of Operations.

Effective July 1, 2018, the Company began to account for its wholly-owned Argentina subsidiary as a highly inflationary economy. As a result, the functional currency of the Argentina subsidiary was changed to the U.S. dollar, Cabot's reporting currency, which is discussed in Note L.

Share Repurchases

Periodically, Cabot repurchases shares of the Company's common stock in the open market or in privately negotiated transactions under the authorization approved by the Board of Directors as discussed in Item 5 under the heading "Issuer Purchases of Equity Securities". The Company retires the repurchased shares and records the excess of the purchase price over par value to additional paid-in capital ("APIC") until such amount is reduced to zero and then charges the remainder against retained earnings.

Financial Instruments

Cabot's financial instruments consist primarily of cash and cash equivalents, accounts and notes receivable, investments, accounts payable and accrued liabilities, short-term and long-term debt, and derivative instruments. The carrying values of Cabot's financial instruments approximate fair value with the exception of fixed rate long-term debt, which is recorded at amortized cost. The fair values of the Company's financial instruments are based on quoted market prices, if such prices are available. In situations where quoted market prices are not available, the Company relies on valuation models to derive fair value. Such valuation takes into account the ability of the financial counterparty to perform and the Company's own credit risk.

Cabot uses derivative financial instruments primarily for purposes of hedging the exposures to fluctuations in foreign currency exchange rates, which exist as part of its on-going business operations. Cabot does not enter into derivative contracts for speculative purposes, nor does it hold or issue any derivative contracts for trading purposes. All derivatives are recognized on the Consolidated Balance Sheets at fair value. Where Cabot has a legal right to offset derivative settlements under a master netting agreement with a counterparty, derivatives with that counterparty are presented on a net basis. The changes in the fair value of derivatives are recorded in either earnings or AOCI, depending on whether or not the instrument is designated as part of a hedge transaction and, if designated as part of a hedge transaction, the type of hedge transaction. The gains or losses on derivative instruments reported in AOCI are reclassified to earnings in the period in which earnings are affected by the underlying hedged item. The ineffective portion of all hedges is recognized in earnings during the period in which the ineffectiveness occurs.

In accordance with Cabot's risk management strategy, the Company may enter into certain derivative instruments that may not be designated as hedges for hedge accounting purposes. Although these derivatives are not designated as hedges, the Company believes that such instruments are closely correlated with the underlying exposure, thus managing the associated risk. The Company records in earnings the gains or losses from changes in the fair value of derivative instruments that are not designated as hedges. Cash movements associated with these instruments are presented in the Consolidated Statements of Cash Flows as Cash Flows from Operating Activities because the derivatives are designed to mitigate risk to the Company's cash flow from operations. The cash flows related to the principal amount of outstanding debt instruments are presented in the Cash Flows from Financing Activities section of the Consolidated Statements of Cash Flows.

Revenue Recognition

Cabot recognizes revenue when persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the price is fixed or determinable and collectability is reasonably assured. Cabot generally is able to ensure that products meet customer specifications prior to shipment. If the Company is unable to determine that the product has met the specified objective criteria prior to shipment or if title has not transferred because of sales terms, the revenue is considered "unearned" and is deferred until the revenue recognition criteria are met.

Shipping and handling charges related to sales transactions are recorded as sales revenue when billed to customers or included in the sales price. Taxes collected on sales to customers are excluded from revenues.

The following table shows the relative size of the revenue recognized in each of the Company's reportable segments:

	Years Ended September 30		
	2018	2017	2016
Reinforcement Materials	57 %	53 %	48 %
Performance Chemicals	33 %	35 %	37 %
Purification Solutions	9 %	11 %	13 %
Specialty Fluids	1 %	1 %	2 %

Cabot derives the substantial majority of its revenues from the sale of products in its Reinforcement Materials, Performance Chemicals, and Purification Solutions segments. Revenue from these products is typically recognized when the product is shipped and title and risk of loss have passed to the customer. The Company offers cash discounts and volume rebates to certain of its customers as sales incentives. The discounts and volume rebates are recorded as a reduction in sales at the time revenue is recognized and are estimated based on historical experience and contractual obligations. Cabot periodically reviews the assumptions underlying its estimates of discounts and volume rebates and adjusts its revenues accordingly.

Revenue in Specialty Fluids arises primarily from the rental of cesium formate. This revenue is recognized throughout the rental period based on the contracted rental terms. Customers are also billed and revenue is recognized, typically at the end of the job, for cesium formate product that is not returned. The Company also generates revenues from cesium formate sold outside of the rental process and from the sale of fine cesium chemicals. This revenue is recognized upon delivery of the product.

Cost of Sales

Cost of sales consists of the cost of raw and packaging materials, direct manufacturing costs, depreciation, internal transfer costs, inspection costs, inbound and outbound freight and shipping and handling costs, plant purchasing and receiving costs and other overhead expenses necessary to manufacture the products.

Accounts and Notes Receivable

Trade receivables are recorded at the invoiced amount and generally do not bear interest. Trade receivables in China may at certain times be settled with the receipt of bank issued non-interest bearing notes. These notes totaled 32 million Chinese Renminbi (“RMB”) ($5 million) and 73 million RMB ($11 million) as of September 30, 2018 and 2017, respectively, and are included in Accounts and notes receivable on the Company’s Consolidated Balance Sheets. Cabot periodically sells a portion of these bank notes and other customer receivables at a discount and such sales are accounted for as asset sales. The Company does not have any continuing involvement with these notes or other customer receivables after the sale. The difference between the proceeds from the sale and the carrying value of these assets is recognized as a loss on the sale of receivables and is included in Other income (expense) in the accompanying Consolidated Statements of Operations. During fiscal 2018, 2017 and 2016, the Company recorded charges of $3 million, $2 million, and $1 million, respectively, for the sale of these assets.

Cabot maintains allowances for doubtful accounts based on an assessment of the collectability of specific customer accounts, the aging of accounts receivable and other economic information on both a historical and prospective basis. Customer account balances are charged against the allowance when it is probable the receivable will not be recovered. There were no material changes in the allowance for any of the years presented. There is no material off-balance sheet credit exposure related to customer receivable balances.

Stock-based Compensation

Cabot recognizes compensation expense for stock-based awards granted to employees using the fair value method. Under the fair value recognition provisions, stock-based compensation cost is measured at the grant date based on the fair value of the award, and is recognized as expense over the service period, which generally represents the vesting period, and includes an estimate of what level of performance the Company will achieve for Cabot’s performance-based stock awards. Cabot calculates the fair value of its stock options using the Black-Scholes option pricing model. The fair value of restricted stock units is determined using the closing price of Cabot stock on the day of the grant.

Selling and Administrative Expenses

Selling and administrative expenses consist of salaries and fringe benefits of sales and office personnel, general office expenses and other expenses not directly related to manufacturing operations.

Research and Technical Expenses

Research and technical expenses include salaries, equipment and material expenditures, and contractor fees and are expensed as incurred.

Income Taxes

Deferred income taxes are determined based on the estimated future tax effects of differences between financial statement carrying amounts and the tax bases of existing assets and liabilities. Deferred tax assets are recognized to the extent that realization of those assets is considered to be more likely than not.

A valuation allowance is established for deferred taxes when it is more likely than not that all or a portion of the deferred tax assets will not be realized. Provisions are made for the U.S. income tax liability and additional non-U.S. taxes on the undistributed earnings of non-U.S. subsidiaries, except for amounts Cabot has designated to be indefinitely reinvested.

Cabot records benefits for uncertain tax positions based on an assessment of whether the position is more likely than not to be sustained by the taxing authorities. If this threshold is not met, no tax benefit of the uncertain tax position is recognized. If the threshold is met, the tax benefit that is recognized is the largest amount that is greater than 50% likely of being realized upon ultimate settlement. This analysis presumes the taxing authorities' full knowledge of the positions taken and all relevant facts, but does not consider the time value of money. The Company also accrues for interest and penalties on its uncertain tax positions and includes such charges in its income tax provision in the Consolidated Statements of Operations.

Environmental Costs

Cabot accrues environmental costs when it is probable that a liability has been incurred and the amount can be reasonably estimated. When a single liability amount cannot be reasonably estimated, but a range can be reasonably estimated, Cabot accrues the amount that reflects the best estimate within that range or the low end of the range if no estimate within the range is better. The amount accrued reflects Cabot's assumptions about remediation requirements at the contaminated site, the nature of the remedy, the outcome of discussions with regulatory agencies and other potentially responsible parties at multi-party sites, and the number and financial viability of other potentially responsible parties. Cabot does not reduce its estimated liability for possible recoveries from insurance carriers. Proceeds from insurance carriers are recorded when realized by either the receipt of cash or a contractual agreement.

Use of Estimates

The preparation of consolidated financial statements in conformity with generally accepted accounting principles in the U.S. requires management to make certain estimates and assumptions that affect the reported amount of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reported period. Actual results could differ from those estimates.

Note B. Recent Accounting Pronouncements

Recently Adopted Accounting Standards

In March 2016, the Financial Accounting Standards Board ("FASB") issued a new standard that amends the accounting standard for stock compensation by simplifying several aspects of the accounting for employee share-based payment transactions, including the related accounting for income taxes, forfeitures, and the withholding of shares to satisfy the employer's tax withholding requirements, as well as classification in the Statements of Cash Flows. The Company adopted the standard on October 1, 2017. The following guidance was updated under the new standard, and its impact to Cabot is described below:

- When accounting for forfeitures the Company may elect to estimate the number of forfeitures to be recognized over the term of an award, which was also permitted under the previous guidance, or account for forfeitures as they occur. The Company elected to modify its accounting policy and account for forfeitures as they occur. The Company applied the accounting change on a modified retrospective basis, which resulted in a cumulative-effect charge of less than $1 million to Retained earnings as of October 1, 2017.
- Excess tax benefits or deficiencies related to stock compensation that were previously recorded to APIC are now recognized as a discrete tax benefit or expense in (Provision) benefit for income taxes within the Consolidated Statements of Operations. The impact on the (Provision) benefit for income taxes was a discrete tax benefit of $2 million during fiscal 2018.
- Excess tax benefits are no longer reclassified out of cash flows from operating activities to financing activities in the Consolidated Statements of Cash Flows. The Company elected to apply this cash flow presentation requirement retrospectively, which resulted in the reclassification of $8 million of tax benefit from share-based compensation awards from cash flows from financing activities to cash flows from operating activities in the Consolidated Statements of Cash Flows for fiscal 2017. There was no impact to the Consolidated Statements of Cash Flows for fiscal 2016 as a result of applying this standard retrospectively.
- Cash paid by an employer when directly withholding shares for tax withholding purposes are required to be classified as a financing activity in the Consolidated Statements of Cash Flows. This method of presentation is consistent with the Company's historical presentation.

In January 2017, the FASB issued a new standard that amends the definition of a business. The standard clarifies the definition of a business with the objective of adding guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. These amendments provide a screen to determine when an integrated set of assets and activities (collectively referred to as a “set”) should be accounted for as an asset rather than a business. In order to be considered a business, a set must include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create output. The guidance also removes the evaluation of whether a market participant could replace missing elements. The Company adopted the standard on October 1, 2017. The adoption of this standard did not impact the Company’s consolidated financial statements.

In August 2017, the FASB issued a new standard that amends the hedge accounting recognition and presentation requirements under hedge accounting. The new standard will make more financial and nonfinancial hedging strategies eligible for hedge accounting, amends the presentation and disclosure requirements, and simplifies how companies assess effectiveness. The Company adopted the standard on October 1, 2017. The adoption of this standard did not impact the Company’s consolidated financial statements.

Recently Issued Accounting Pronouncements

In May 2014, the FASB issued a new standard that amends the existing accounting standards for revenue recognition. The standard requires entities to recognize revenue when they transfer promised goods or services to customers in an amount that reflects the consideration the entity expects to be entitled to in exchange for those goods or services. This standard is applicable for fiscal years beginning after December 15, 2017. The Company has completed its assessment of the new standard, which included reviewing a sample of contracts across the Company's four business segments. Based on this assessment, the adoption of this standard will not have a material impact on how the Company recognizes revenue. The Company will implement the updates that are necessary to its revenue recognition policy, internal controls, processes and financial statement disclosures. The Company will adopt this standard on October 1, 2018 and expects to apply a modified retrospective approach.

In February 2016, the FASB issued a new standard for the accounting for leases. This new standard requires lessees to recognize assets and liabilities for most leases, but recognize expenses on their income statements in a manner that is similar to the current accounting treatment for leases. The standard is applicable for fiscal years beginning after December 15, 2018 and for interim periods within those years, and early adoption is permitted. The Company expects to adopt the standard on October 1, 2019. The Company has established a project plan and implementation team which will analyze the current portfolio of leases to determine the impact of adopting this new standard. The implementation team will also be responsible for evaluating and designing the necessary changes to the Company's business processes, lease policies, systems and internal controls to support recognition and disclosure under the new guidance.

In August 2016, the FASB issued final amendments to clarify how entities should classify certain cash receipts and cash payments on the statement of cash flows such as distributions received from equity method investees, proceeds from the settlement of insurance claims, and proceeds from the settlement of corporate-owned life insurance policies. The new standard is effective for fiscal years beginning after December 15, 2017, including interim periods within those years, and early adoption is permitted. The Company will adopt this standard on October 1, 2018. The adoption of this standard is not expected to materially impact the Company's consolidated financial statements.

In March 2017, the FASB issued a new standard that amends the requirements on the presentation of net periodic pension and postretirement benefit costs. Currently, net benefit costs are reported as employee costs within operating income. The new standard requires the service cost component to be presented with other employee compensation costs. The other components will be reported separately outside of operations. The new standard is effective for fiscal years beginning after December 15, 2017, including interim periods within those years, and early adoption is permitted as of the beginning of any annual period for which an entity's financial statements (interim or annual) have not been issued. The Company will adopt this standard on October 1, 2018. The adoption of this standard is not expected to materially impact the Company's consolidated financial statements.

In February 2018, the FASB issued a new standard that allows entities to reclassify from AOCI to Retained earnings for stranded tax effects resulting from enactment of the Tax Cuts and Jobs Act of 2017 (the "Act"). The amendments in this new standard also require certain disclosures about stranded tax effects. The new standard is effective for all entities for fiscal years beginning after December 15, 2018, including interim periods within those years, and early adoption is permitted. The Company is evaluating this standard and the timing of its adoption. The adoption of this standard is not expected to materially impact the Company's consolidated financial statements.

In August 2018, the FASB issued a new standard that amends existing annual disclosure requirements applicable to all employers that sponsor defined benefit pension and other postretirement plans by adding, removing, and clarifying certain disclosures. The standard is effective for fiscal years beginning after December 15, 2020, and early adoption is permitted. The Company is evaluating this standard and the timing of its adoption. The adoption of this standard is not expected to materially impact the Company's consolidated financial statements.

Note C. Acquisitions

Tech Blend

In November 2017, the Company acquired Tech Blend, a North American producer of black masterbatches, for a purchase price of $65 million, paid in cash. The purchase price was subject to a working capital adjustment, which was immaterial. The operating results of the business are included in the Company's Performance Chemicals segment. The acquisition extends the Company's global footprint in black masterbatch and compounds and provides a platform to serve global customers and grow in conductive formulations. Since the date of acquisition, Tech Blend revenues have totaled approximately $26 million through September 30, 2018.

The Company incurred acquisition costs of less than $1 million through September 30, 2018 associated with the transaction, which are included in Selling and administrative expenses in the Consolidated Statements of Operations.

The allocation of the purchase price set forth below was based on estimates of the fair value of assets acquired and liabilities assumed.

	(In millions)
Assets	
Cash	$ 1
Accounts receivable	5
Inventories	3
Property, plant and equipment	7
Intangible assets	29
Goodwill	33
Total assets acquired	78
Liabilities	
Current liabilities	(3)
Deferred tax liabilities	(10)
Total liabilities assumed	(13)
Cash consideration paid	$ 65

As part of the purchase price allocation, the Company determined the separately identifiable intangible assets are comprised of developed technologies of $21 million, which will be amortized over 25 years, and customer relationships of $8 million, which will be amortized over 12 years. The Company estimated the fair values of the identifiable acquisition-related intangible assets based on projections of cash flows that will arise from those assets. The projected cash flows were discounted to determine the fair value of the assets at the date of acquisition. The determination of the fair value of the intangible assets acquired required the use of significant judgment with regard to (i) assumptions in the discounted cash flow model used and (ii) determination of the useful lives of the developed technologies and customer relationships.

The excess of the purchase price over the fair value of the tangible net assets and intangible assets acquired was recorded as goodwill. The goodwill recognized is attributable to the growth and operating synergies that the Company expects to realize from this acquisition. Goodwill generated from the acquisition will not be deductible for tax purposes.

NSCC Carbon (Jiangsu) Co. Ltd

In September 2018, the Company acquired NSCC Carbon, a carbon black manufacturing facility in Pizhou, Jiangsu Province, China for the purchase price of $8 million. The manufacturing facility will support the Company's specialty carbons product line within the Performance Chemicals segment. The plant is temporarily mothballed to conduct maintenance and technology upgrades that are expected to occur over the next two years. The total purchase price of $8 million, which is payable upon satisfaction of certain conditions that are expected to be completed in less than 12 months, is recorded within Accounts payable and accrued liabilities on the Consolidated Balance Sheets.

Note D. Inventories

Inventories, net of obsolete, unmarketable and slow moving reserves, are as follows:

	September 30	
	2018	2017
	(In millions)	
Raw materials	$129	$93
Work in process	3	2
Finished goods	329	293
Other	50	45
Total	$511	$433

Effective October 1, 2017, the Company changed its method of accounting for its U.S. carbon black inventories from the LIFO method to the FIFO method. Total U.S. inventories accounted for utilizing the LIFO cost flow assumption represented 7% of the Company's total worldwide inventories as of September 30, 2017. Refer to the discussion under the heading "Inventories" in Note A for details on the impact of the change on the consolidated financial statements. Other inventory is comprised of certain spare parts and supplies.

Cabot periodically reviews inventory for both obsolescence and loss of value. In this review, Cabot makes assumptions about the future demand for and market value of the inventory and, based on these assumptions, estimates the amount of obsolete, unmarketable or slow moving inventory. At September 30, 2018 and 2017, total inventory reserves were $38 million and $19 million, respectively. During fiscal year 2018, the Company recorded a lower of cost or market charge in the amount of $13 million related to its Purification Solutions inventory held at several sites in North America and Europe.

Note E. Property, Plant and Equipment

Property, plant and equipment consists of the following:

	September 30	
	2018	2017
	(In millions)	
Land and land improvements	$ 142	$ 151
Buildings	514	531
Machinery and equipment	2,373	2,527
Other	249	243
Construction in progress	242	150
Total property, plant and equipment	3,520	3,602
Less: Accumulated depreciation	(2,224)	(2,297)
Net property, plant and equipment	$ 1,296	$ 1,305

Depreciation expense was $142 million, $147 million and $154 million for fiscal 2018, 2017 and 2016, respectively.

Note F. Purification Solutions Goodwill and Long-Lived Assets Impairment Charges

During the second quarter of fiscal 2018, the Company recorded impairment charges relating to the goodwill and long-lived assets of the Purification Solutions reporting unit, and an associated deferred tax benefit, in the Consolidated Statements of Operations as follows:

	Three Months Ended March 31, 2018
	(In millions)
Purification Solutions goodwill impairment charge	$ 92
Purification Solutions long-lived assets impairment charge	162
Benefit for income taxes	(30)
Impairment charges, after tax	$ 224

In the second quarter of fiscal 2018, the Purification Solutions reporting unit experienced further share losses, lower customer demand and declining prices in the mercury removal and North America powdered activated carbon applications, which led the Company to reassess its previous estimates for expected growth in volumes, prices and margins in the reporting unit. The forecasted demand and profit margins in mercury removal applications were lowered reflecting further unit closures at coal-fired utility plants, lower usage levels of activated carbon and lower plant utilization levels for coal-fired utilities, as well as lower pricing due to industry overcapacity, among other factors. While development programs continue to progress, growth estimates in other environmental and specialty applications were also lowered, reflecting heightened competition and updated timelines to commercialize certain new products. Due to these revised forecasts, the Company performed the quantitative goodwill impairment test and determined that the estimated fair value of the Purification Solutions reporting unit was lower than the reporting unit's carrying value, resulting in a goodwill impairment charge of $92 million.

In determining the fair value of the Purification Solutions reporting unit, the Company used an income approach (a discounted cash flow analysis) which incorporated significant estimates and assumptions related to future periods, including growth rates in environmental and specialty applications and pricing assumptions of activated carbon, among others. In addition, an estimate of the reporting unit’s weighted average cost of capital (“WACC”) was used to discount future estimated cash flows to their present value. The WACC was based upon externally available data considering market participants’ cost of equity and debt, optimal capital structure and risk factors specific to the Purification Solutions reporting unit.

Prior to determining the goodwill impairment charge, the Company considered whether the assets of the reporting unit, which is also considered the asset group, were recoverable. As a result of this assessment, the Company recorded an inventory reserve adjustment of $13 million and impairments to long lived assets of $162 million. The adjustment to inventory carrying value was determined based on reassessments of volumes, pricing, and margins described above and was recorded in Cost of sales in the Consolidated Statements of Operations. The impairment analysis to assess if definite-lived intangible assets and property, plant and equipment were recoverable was based on the estimated undiscounted cash flows of the reporting unit, and these cash flows were not sufficient to recover the carrying value of the long-lived assets over their remaining useful lives. Accordingly, the Company recorded impairment charges of $64 million and $98 million, to its definite-lived intangible assets and property, plant and equipment, respectively, in the second quarter of fiscal 2018 based on the lower of the carrying amount or fair value of the long-lived assets.

The Company used the income approach to determine the fair value of the definite-lived intangible assets and the cost approach to determine the fair value of its property, plant and equipment. Cabot will continue to monitor for events or changes in business circumstances that may indicate that the remaining carrying value of the asset group may not be recoverable.

The Company recorded a tax benefit related to the impairment charges of $30 million in the second quarter of fiscal 2018 which was subsequently reduced by $1 million after the impairment charges by tax jurisdiction were finalized.

Note G. Goodwill and Intangible Assets

Cabot had goodwill balances of $93 million and $154 million at September 30, 2018 and September 30, 2017, respectively. The carrying amount of goodwill attributable to each reportable segment with goodwill balances and the changes in those balances during the period ended September 30, 2018 are as follows:

	Reinforcement Materials	Performance Chemicals	Purification Solutions	Total
	(In millions)			
Balance at September 30, 2017	$53	$ 9	$ 92	$154
Goodwill acquired [(1)]	—	33	—	33
Impairment charge [(2)]	—	—	(92)	(92)
Foreign currency impact	(1)	(1)	—	(2)
Balance at September 30, 2018	$52	$ 41	$ —	$93

(1) Consists of goodwill acquired in the acquisition of Tech Blend as described in Note C.

(2) Refer to Note F for details on the Purification Solutions goodwill impairment test and the resulting impairment charge recorded in the second fiscal quarter of 2018. Based on the Company's most recent annual goodwill impairment test performed as of May 31, 2018, the fair values of the Reinforcement Materials, Fumed Metal Oxides, and Specialty Compounds reporting units were substantially in excess of their carrying values.

Reinforcement	Performance	Purification	Total

	Materials	Chemicals	Solutions	
	(In millions)			
Accumulated impairment losses at September 30, 2017	$—	$ —	$ (352)	$(352)
Accumulated impairment losses at September 30, 2018	$—	$ —	$ (444)	$(444)

The following table provides information regarding the Company's intangible assets:

	September 30, 2018			September 30, 2017		
	Gross Carrying Value	Accumulated Amortization	Net Intangible Assets	Gross Carrying Value	Accumulated Amortization	Net Intangible Assets
	(In millions)					
Intangible assets with finite lives [(1)]						
Developed technologies	$52	$ (2)	$ 50	$49	$ (7)	$ 42
Trademarks	8	—	8	16	(1)	15
Customer relationships	51	(11)	40	94	(14)	80
Total intangible assets	$111	$ (13)	$ 98	$159	$ (22)	$ 137

(1) Refer to Note F for intangible assets impairment charges recorded in the second fiscal quarter of 2018.

Intangible assets are amortized over their estimated useful lives, which range between twelve and twenty-five years, with a weighted average amortization period of approximately 19 years. Amortization expense for the years ended September 30, 2018, 2017 and 2016 was $7 million, $8 million and $7 million, respectively, and is included in Cost of sales and Selling and administrative expenses in the Consolidated Statements of Operations. Total amortization expense is estimated to be approximately $6 million each year for the next five fiscal years.

Note H. Accounts Payable, Accrued Liabilities and Other Liabilities

Accounts payable and accrued liabilities included in current liabilities consist of the following:

	September 30	
	2018	2017
	(In millions)	
Accounts payable	$446	$339
Accrued employee compensation	70	51
Other accrued liabilities	97	67
Total	$613	$457

Other long-term liabilities consist of the following:

	September 30	
	2018	2017
	(In millions)	
Employee benefit plan liabilities	$118	$122
Non-current tax liabilities	19	19
Other accrued liabilities	115	104
Total	$252	$245

Note I. Debt and Other Obligations

Long-term Obligations

The Company’s long-term obligations, the fiscal year in which they mature and their respective interest rates are summarized below:

	September 30	
	2018	2017
	(In millions)	

Variable Rate Debt:		
Revolving Credit Facility, expires fiscal 2023	$—	$—
Revolving Credit Facility - Canada, expires fiscal 2021	90	—
Total variable rate debt	90	—
Fixed Rate Debt:		
2.55% Notes matured fiscal 2018	—	250
3.7% Notes due fiscal 2022	350	350
3.4% Notes due fiscal 2026	250	250
Medium Term Notes:		
Notes due fiscal 2019, 7.42%	30	30
Notes due fiscal 2022, 8.34% — 8.47%	15	15
Notes due fiscal 2028, 6.57% — 7.28%	8	8
Total Medium Term Notes	53	53
Chinese Renminbi Debt, due fiscal 2018, 4.75%	—	5
Chinese Renminbi Debt, due fiscal 2019, 4.35%	4	—
Total fixed rate debt	657	908
Capital lease obligations, due through fiscal 2033	11	13
Unamortized debt issuance costs and debt discount	(4)	(4)
Total debt	754	917
Less current portion of long-term debt	(35)	(256)
Total long-term debt	$719	$661

Revolving Credit Facility, expiring fiscal 2023—The amount available for borrowing under the revolving credit agreement was $751 million as of September 30, 2018. The revolving credit agreement, which matures on October 23, 2022, subsequent to the exercise of the two one-year options to extend the maturity on the first and second anniversaries of the effective date, supports the Company's commercial paper program. Borrowings may be used for working capital, letters of credit and other general corporate purposes. The revolving credit agreement contains affirmative and negative covenants, a single financial covenant (consolidated total debt to consolidated EBITDA, as defined in the credit agreement) and events of default customary for financings of this type.

Revolving Credit Facility-Canada expiring fiscal 2021—In September 2018, a Canadian subsidiary entered into a revolving credit agreement with a loan commitment not to exceed $100 million United States dollars. The amount available for borrowing under this revolving credit agreement was $10 million as of September 30, 2018. The revolving credit agreement, which matures on September 24, 2021, subject to the right to request a one-year extension, may be used for working capital, capital expenditures and other general corporate purposes. The revolving credit agreement is guaranteed by Cabot Corporation.

Chinese Renminbi Debt—The Company's consolidated Chinese subsidiaries had $4 million and $5 million of unsecured long-term debt outstanding with a noncontrolling shareholder of a consolidated subsidiary as of September 30, 2018 and 2017, respectively.

2.55% Notes matured fiscal 2018—In July 2012, Cabot issued $250 million in registered notes with a coupon of 2.55% that matured on January 15, 2018. These notes were unsecured and paid interest on January 15 and July 15. The net proceeds of this offering were $248 million after deducting discounts and issuance costs. The discount of less than $1 million was recorded at issuance and was amortized over the life of the notes. The notes were paid in full during the second quarter of fiscal 2018.

3.7% Notes due fiscal 2022—In July 2012, Cabot issued $350 million in registered notes with a coupon of 3.7% that mature on July 15, 2022. These notes are unsecured and pay interest on January 15 and July 15. The net proceeds of this offering were $347 million after deducting discounts and issuance costs. The discount of less than $1 million was recorded at issuance and is being amortized over the life of the notes.

3.4% Notes due fiscal 2026—In September 2016, Cabot issued $250 million in registered notes with a coupon of 3.4% that mature on September 15, 2026. These notes are unsecured and pay interest on March 15 and September 15. The net proceeds of this offering were $248 million after deducting discounts and issuance costs. The discount of less than $1 million was recorded at issuance and is being amortized over the life of the notes.

Medium Term Notes—At both September 30, 2018 and 2017, there were $53 million of unsecured medium term notes outstanding issued to numerous lenders with various fixed interest rates and maturity dates. The weighted average maturity of the total outstanding medium term notes is 3 years with a weighted average interest rate of 7.65%.

Capital Lease Obligations—Cabot had capital lease obligations for certain equipment and buildings with a recorded value of $11 million and $13 million at September 30, 2018 and 2017, respectively. Cabot will make payments totaling $17 million over the next 15 years, including $6 million of imputed interest. At both September 30, 2018 and 2017, the original cost of capital lease assets was $20 million. At September 30, 2018 and 2017, the associated accumulated depreciation of assets under capital leases was $13 million and $12 million, respectively. The amortization related to those assets under capital lease is included in depreciation expense.

Future Years Payment Schedule

The aggregate principal amounts of long-term debt and capital lease obligations due in each of the five years from fiscal 2019 through 2023 and thereafter are as follows:

Years Ending September 30	Principal on Long-Term Debt	Payments on Capital Lease Obligations	Total
	(In millions)		
2019	$ 34	$ 1	$ 35
2020	—	2	2
2021	90	2	92
2022	365	2	367
2023	—	2	2
Thereafter	258	8	266
Less: Interest	—	(6)	(6)
Total	$ 747	$ 11	$ 758

Standby letters of credit—At September 30, 2018, the Company had provided standby letters of credit that were outstanding and not drawn totaling $7 million, which expire through fiscal 2019.

Short-term Borrowings

Commercial Paper—The Company has a commercial paper program and the maximum aggregate balance of commercial paper notes outstanding and the amounts borrowed under the revolving credit facility may not exceed the borrowing capacity of $1 billion under the revolving credit facility. The proceeds from the issuance of the commercial paper have been used for general corporate purposes, which may include working capital, refinancing existing indebtedness, capital expenditures, share repurchases, and acquisitions. The revolving credit facility is available to repay the outstanding commercial paper, if necessary.

There was an outstanding balance of commercial paper of $249 million as of September 30, 2018 with a weighted average interest rate of 2.36% and no balance outstanding as of September 30, 2017.

Short-term Notes Payable—The Company had unsecured notes with maturities of less than one year of $7 million at September 30, 2017, with a weighted-average interest rate of 8.1%. There were no short term notes payable as of September 30, 2018.

Redeemable Preferred Stock

In November 2013, the Company purchased all of its joint venture partner's common stock in the former NHUMO, S.A. de C.V. ("NHUMO") joint venture. At the close of the transaction, NHUMO issued redeemable preferred stock to the joint venture partner with a repurchase value of $25 million and a fixed dividend rate of 6% per annum. In November 2018, the Company repurchased the preferred stock for $25 million and paid a final dividend payment of approximately $1.4 million. The preferred stock was accounted for as a financing obligation and has been separately presented in the Consolidated Balance Sheets as a current liability as of September 30, 2018 and as a long-term liability as of September 30, 2017.

Note J. Financial Instruments and Fair Value Measurements

The FASB authoritative guidance on fair value measurements defines fair value, provides a framework for measuring fair value, and requires certain disclosures about fair value measurements. The required disclosures focus on the inputs used to measure fair value. The guidance establishes the following hierarchy for categorizing these inputs:

Level 1—Quoted market prices in active markets for identical assets or liabilities

Level 2—Significant other observable inputs (e.g., quoted prices for similar items in active markets, quoted prices for identical or similar items in markets that are not active, inputs other than quoted prices that are observable such as interest rate and yield curves, and market-corroborated inputs)

Level 3—Significant unobservable inputs

There were no transfers of financial assets or liabilities measured at fair value between Level 1 and Level 2, and there were no Level 3 investments during fiscal 2018 or 2017.

At both September 30, 2018 and 2017, Cabot had derivatives relating to foreign currency risks carried at fair value. At September 30, 2018 and 2017, the fair value of these derivatives was a net liability of $18 million and $13 million, respectively, and was included in Prepaid expenses and other current assets and Other liabilities on the Consolidated

Balance Sheets. These derivatives are classified as Level 2 instruments within the fair value hierarchy as the fair value determination was based on observable inputs.

At September 30, 2018 and 2017, the fair value of Guaranteed investment contracts, included in Other assets on the Consolidated Balance Sheets, was $11 million and $12 million, respectively. Guaranteed investment contracts were classified as Level 2 instruments within the fair value hierarchy as the fair value determination was based on other observable inputs.

At both September 30, 2018 and 2017, the fair values of cash and cash equivalents, accounts and notes receivable, accounts payable and accrued liabilities, and short term borrowings and variable rate debt approximated their carrying values due to the short-term nature of these instruments. The carrying value and fair value of the long-term fixed rate debt were $0.75 billion and $0.74 billion, respectively, as of September 30, 2018 and $0.91 billion and $0.94 billion, respectively, as of September 30, 2017. The fair values of Cabot’s fixed rate long-term debt are estimated based on comparable quoted market prices at the respective period ends. The carrying amounts of Cabot’s floating rate long-term debt and capital lease obligations approximate their fair values. All such measurements are based on observable inputs and are classified as Level 2 within the fair value hierarchy. The valuation technique used is the discounted cash flow model.

Note K. Derivatives

Risk Management

Cabot’s business operations are exposed to changes in interest rates, foreign currency exchange rates and commodity prices because Cabot finances certain operations through long and short-term borrowings, denominates transactions in a variety of foreign currencies and purchases certain commoditized raw materials. Changes in these rates and prices may have an impact on future cash flows and earnings. The Company manages these risks through normal operating and financing activities and, when deemed appropriate, through the use of derivative financial instruments.

The Company has policies governing the use of derivative instruments and does not enter into financial instruments for trading or speculative purposes.

By using derivative instruments, Cabot is subject to credit and market risk. If a counterparty fails to fulfill its performance obligations under a derivative contract, Cabot’s credit risk will equal the fair value of the derivative. Generally, when the fair value of a derivative contract is positive, the counterparty owes Cabot, thus creating a payment risk for Cabot. The Company minimizes counterparty credit (or repayment) risk by entering into transactions with major financial institutions of investment grade credit rating. Cabot’s exposure to market risk is not hedged in a manner that completely eliminates the effects of changing market conditions on earnings or cash flow. No significant concentration of credit risk existed at September 30, 2018.

Interest Rate Risk Management

Cabot’s objective is to maintain a certain fixed-to-variable interest rate mix on the Company’s debt obligations. Cabot may enter into interest rate swaps as a hedge of the underlying debt instruments to effectively change the characteristics of the interest rate without changing the debt instrument. As of both September 30, 2018 and 2017, there were no derivatives held to manage interest rate risk.

Foreign Currency Risk Management

Cabot’s international operations are subject to certain risks, including currency exchange rate fluctuations and government actions. Cabot endeavors to match the currency in which debt is issued to the currency of the Company’s major, stable cash receipts. In some situations, Cabot has issued debt denominated in U.S. dollars and then entered into cross-currency swaps that exchange the dollar principal and interest payments into Euro denominated principal and interest payments.

Additionally, the Company has foreign currency exposure arising from its net investments in foreign operations. Cabot may enter into cross-currency swaps to mitigate the impact of currency rate changes on the Company’s net investments.

The Company also has foreign currency exposure arising from the denomination of monetary assets and liabilities in foreign currencies other than the functional currency of a given subsidiary as well as the risk that currency fluctuations could affect the dollar value of future cash flows generated in foreign currencies. Accordingly, Cabot uses short-term forward contracts to minimize the exposure to foreign currency risk. In certain situations where the Company has forecasted purchases under a long-term commitment or forecasted sales denominated in a foreign currency, Cabot may enter into appropriate financial instruments in accordance with the Company’s risk management policy to hedge future cash flow exposures.

The following table provides details of the derivatives held as of September 30, 2018 and 2017 to manage foreign currency risk.

		Notional Amount		Hedge
Description	Borrowing	September 30, 2018	September 30, 2017	Designation
Cross Currency Swaps	3.4% Notes	USD 250 million swapped to EUR 223 million	USD 250 million swapped to EUR 223 million	Net investment
Forward Foreign Currency Contracts[1]	N/A	USD 18 million	USD 5 million	No designation

[1] Cabot's forward foreign exchange contracts are denominated in the Indonesian rupiah and Czech koruna.

Accounting for Derivative Instruments and Hedging Activities

The Company determines the fair value of financial instruments using quoted market prices whenever available. When quoted market prices are not available for various types of financial instruments (such as forwards, options and swaps), the Company uses standard models with market-based inputs, which take into account the present value of estimated future cash flows and the ability of Cabot or the financial counterparty to perform. For interest rate and cross-currency swaps, the significant inputs to these models are interest rate curves for discounting future cash flows and are adjusted for credit risk. For forward foreign currency contracts, the significant inputs are interest rate curves for discounting future cash flows, and exchange rate curves of the foreign currency for translating future cash flows.

Fair Value Hedge

For derivative instruments that are designated and qualify as fair value hedges, the gain or loss on the derivative as well as the offsetting gain or loss on the hedged item attributable to the hedged risk are recognized in current period earnings.

Cash Flow Hedge

For derivative instruments that are designated and qualify as cash flow hedges, the effective portion of the gain or loss on the derivative is recorded in AOCI and reclassified to earnings in the same period or periods during which the hedged transaction affects earnings. Gains and losses on the derivative representing either hedge ineffectiveness or hedge components excluded from the assessment of effectiveness are recognized in current period earnings.

Net Investment Hedge

For net investment hedges, changes in the fair value of the effective portion of the derivatives’ gains or losses are reported as foreign currency translation gains or losses in AOCI while changes in the ineffective portion are reported in earnings. Effectiveness is assessed based on the hypothetical derivative method. The gains or losses on derivative instruments reported in AOCI are reclassified to earnings in the period in which earnings are affected by the underlying item, such as a disposal or substantial liquidations of the entities being hedged. Effective October 1, 2017, the Company elected to de-designate its existing net investment hedge instruments in which hedge effectiveness was assessed using the method based on changes in forward exchange rates and re-designate them to use the method based on changes in spot exchange rates.

The Company has cross-currency swaps with a notional amount of $250 million, which are designated as hedges of its net investments in certain Euro denominated subsidiaries. Cash settlements occur semi-annually on March 15th and September 15th for fixed rate interest payments and a cash exchange of the notional currency amount will occur at the end of the term in 2026. During fiscal 2018 and fiscal 2017, the Company received net cash interest of $3 million and $4 million, respectively. As of September 30, 2018, the fair value of these swaps was a net liability of $18 million and was included in Prepaid expenses and other current assets and Other liabilities, and the cumulative loss of $14 million was included in AOCI on the Consolidated Balance Sheets. As of September 30, 2017, the fair value of these swaps was a net liability of $13 million and was included in Prepaid expenses and other current assets and Other liabilities, and the cumulative loss of $9 million was included in AOCI on the Consolidated Balance Sheets.

The following table summarizes the impact of the cross-currency swaps to AOCI and the Consolidated Statements of Operations:

	Years Ended September 30								
	2018	2017	2016	2018	2017	2016	2018	2017	2016
Description	Gain/(Loss) Recognized in AOCI (In millions)			(Gain)/Loss Reclassified from AOCI into Interest Expense in the Consolidated Statements of Operations			(Gain)/Loss Recognized in Interest Expense in the Consolidated Statements of Operations (Amount Excluded from Effectiveness Testing)		
Cross-currency swaps (1)	$(2)	$(10)	$ 1	$ (5)	$ —	$ —	$ 2	$ —	$ —

(1) As noted above, effective October 1, 2017, the Company changed the method it uses to assess effectiveness from the method based on changes in forward exchange rates, in which all gains/losses were recognized in AOCI, to the method based on changes in spot exchange rates.

Other Derivative Instruments

From time to time, the Company may enter into certain derivative instruments that may not be designated as hedges for accounting purposes, which may include cross-currency swaps, foreign currency forward contracts and commodity derivatives. For cross-currency swaps and foreign currency forward contracts not designated as hedges, the Company uses standard models with market-based inputs. The significant inputs to these models are interest rate curves for discounting future cash flows, and exchange rate curves of the foreign currency for translating future cash flows. In determining the fair value of the commodity derivatives, the significant inputs to valuation models are quoted market prices of similar instruments in active markets. Although these derivatives do not qualify for hedge accounting, Cabot believes that such instruments are closely correlated with the underlying exposure, thus managing the associated risk. The gains or losses from changes in the fair value of derivative instruments that are not accounted for as hedges are recognized in current period earnings.

At both September 30, 2018 and 2017, the fair value of derivative instruments not designated as hedges were immaterial. At September 30, 2018 and 2017, these instruments were presented in Accounts payable and accrued liabilities and Prepaid expenses and other current assets, respectively, on the Consolidated Balance Sheets.

Note L. Hyperinflationary Economies

Argentina

Cabot owns 100% of a carbon black operating entity in Argentina. Due to recent negative economic trends in Argentina, including multiple periods of increasing inflation rates, devaluation of the Argentine peso, and increasing borrowing rates locally, the cumulative three-year inflation rate for the country exceeds 100%, and is expected to exceed 100% for the foreseeable future. Therefore, effective July 1, 2018, the operating entity was considered to be functioning in a highly inflationary economy and began using Cabot's reporting currency, the U.S. dollar, as its functional currency. There was no financial statement impact at the date of conversion due to the change in functional currency. Going forward, all impacts of foreign exchange changes between the reporting currency and Argentine peso will be reflected in earnings in the accompanying Consolidated Statements of Operations.

The Company's income from operations is not expected to be significantly impacted from this change since the operating entity's sales and a portion of its raw material purchases were already denominated in U.S. dollars. The operating entity's net revenue represented approximately 2% of Cabot's total net revenue for the year ended September 30, 2018.

The operating entity's monetary and non-monetary assets and liabilities held in local currency consist primarily of cash and cash equivalents, inventories, property, plant and equipment and accounts payable and accrued liabilities, which make up less than 2% of Cabot's total assets and total liabilities as of September 30, 2018. Changes in the Argentine peso exchange rate will result in foreign currency exchange gains or losses on the operating entity's peso-denominated monetary assets and liabilities. Subsequent to the conversion, the Company recorded a $3 million net gain within Other (income) expense in the Consolidated Statements of Operations for the year ended September 30, 2018, which reflects the remeasurement of the operating entity's net monetary liabilities denominated in Argentine peso using an exchange rate of 39.70 Argentine peso to the U.S. dollar at September 30, 2018.

The Company will continue to monitor the developments in Argentina and their potential impact the operating entity's operations or carrying value.

Venezuela

Cabot owns 49% of a carbon black operating affiliate in Venezuela, which is accounted for as an equity affiliate, through wholly-owned subsidiaries that carry the investment and receive its dividends. As of September 30, 2018, these subsidiaries carried the operating affiliate investment of $13 million.

During fiscal 2018, 2017 and 2016, the Company received dividends in the amounts of $3 million, $4 million and $2 million, respectively, which were paid in U.S. dollars.

A significant portion of the Company's operating affiliate's sales are exports denominated in U.S. dollars. The Venezuelan government mandates that a certain percentage of the dollars collected from these sales be converted into bolivars. The exchange rate made available to the Company as of September 30, 2017 was 3,345 bolivars to the U.S. dollar. During fiscal 2018, the bolivar experienced significant devaluation and reached 172,800 bolivars to the U.S. dollar at the end of July 2018. In August 2018, Venezuela issued the bolivar soberano to replace the existing bolivar in response to hyperinflation. The value of one bolivar soberano is equal to the value of 100,000 bolivars. The exchange rate made available to the Company as of September 30, 2018 was 62 bolivars soberano to the U.S. dollar. Due to a reduced level of export sales in recent periods, the exchange rate devaluation during fiscal 2018 had an immaterial impact on the Company's results.

The operating entity has historically been profitable. The Company continues to closely monitor developments in Venezuela and their potential impact on the recoverability of its equity affiliate investment. Any future change in the exchange rate made available to the Company could cause the Company to change the exchange rate it uses and result in gains or losses on the bolivar denominated assets held by its operating affiliate and wholly-owned subsidiaries.

Note M. Employee Benefit Plans

The information below provides detail concerning the Company’s benefit obligations under the defined benefit and postretirement benefit plans it sponsors.

Defined benefit plans provide pre-determined benefits to employees that are distributed upon retirement. Cabot is making all sponsor required contributions to these plans. The accumulated benefit obligation was $143 million for the U.S. defined benefit plans and $349 million for the foreign plans as of September 30, 2018 and $160 million for the U.S. defined benefit plans and $351 million for the foreign plans as of September 30, 2017.

In addition to benefits provided under the defined benefit and postretirement benefit plans, the Company provides benefits under defined contribution plans. Cabot recognized expenses related to these plans of $19 million in fiscal 2018, $18 million in fiscal 2017 and $17 million in fiscal 2016.

The following provides information about projected benefit obligations, plan assets, the funded status and weighted-average assumptions of the defined benefit pension and postretirement benefit plans:

	Years Ended September 30							
	2018		2017		2018		2017	
	Pension Benefits				Postretirement Benefits			
	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign
	(In millions)							
Change in Benefit Obligations:								
Benefit obligation at beginning of year	$160	$ 376	$175	$ 400	$33	$ 20	$37	$ 20
Service cost	1	9	1	10	—	—	—	—
Interest cost	5	7	4	6	1	1	1	1
Plan participants' contribution	—	2	—	2	—	—	—	—
Foreign currency exchange rate changes	—	(7)	—	16	—	(1)	—	—
(Gain) Loss from changes in actuarial assumptions and plan experience	(10)	2	(7)	(42)	(2)	—	(2)	(1)
Benefits paid	(7)	(13)	(7)	(12)	(3)	(1)	(3)	—
Settlements or curtailments	(5)	(2)	(5)	(3)	—	—	—	—
Other	(1)	(1)	(1)	(1)	—	—	—	—
Benefit obligation at end of year	$143	$ 373	$160	$ 376	$29	$ 19	$33	$ 20

	Years Ended September 30							
	2018		2017		2018		2017	
	Pension Benefits				Postretirement Benefits			
	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign
	(In millions)							
Change in Plan Assets:								
Fair value of plan assets at beginning of year	$156	$ 318	$157	$ 305	$—	$ —	$—	$ —
Actual return on plan assets	4	17	12	6	—	—	—	—
Employer contribution	1	9	1	9	3	1	3	—
Plan participants' contribution	—	2	—	2	—	—	—	—
Foreign currency exchange rate changes	—	(7)	—	12	—	—	—	—
Benefits paid	(7)	(13)	(7)	(12)	(3)	(1)	(3)	—
Settlements	(4)	(2)	(6)	(3)	—	—	—	—
Expenses paid from assets	(1)	(1)	(1)	(1)	—	—	—	—
Fair value of plan assets at end of year	$149	$ 323	$156	$ 318	$—	$ —	$—	$ —
Funded status	$6	$ (50)	$(4)	$ (58)	$(29)	$ (19)	$(33)	$ (20)

Recognized asset (liability)	$6	$ (50)	$(4)	$ (58)	$(29)	$ (19)	$(33)	$ (20)

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Pension Assumptions and Strategy

The following assumptions were used to determine the pension benefit obligations and periodic benefit costs as of and for the years ended September 30:

	2018			2017			2016		
	Pension Benefits								
	U.S.	Foreign		U.S.	Foreign		U.S.	Foreign	
Actuarial assumptions as of the year-end measurement date:									
Discount rate	4.2%	2.4	%	3.6%	2.4	%	3.4%	1.8	%
Rate of increase in compensation	N/A	2.7	%	N/A	2.7	%	N/A	2.8	%
Actuarial assumptions used to determine net periodic benefit cost during the year:									
Discount rate - benefit obligation	3.6%	2.4	%	3.4%	1.8	%	4.2%	2.9	%
Discount rate - service cost	N/A	2.4	%	N/A	1.8	%	N/A	2.8	%
Discount rate - interest cost	3.0%	2.0	%	2.7%	1.5	%	3.3%	2.4	%
Expected long-term rate of return on plan assets	6.8%	4.9	%	6.8%	4.7	%	7.5%	5.1	%
Rate of increase in compensation	N/A	2.7	%	N/A	2.8	%	N/A	2.8	%

Postretirement Assumptions and Strategy

The following assumptions were used to determine the postretirement benefit obligations and net costs as of and for the years ended September 30:

	2018			2017			2016		
	Postretirement Benefits								
	U.S.	Foreign		U.S.	Foreign		U.S.	Foreign	
Actuarial assumptions as of the year-end measurement date:									
Discount rate	4.1%	3.2	%	3.4%	3.1	%	3.0%	2.8	%
Initial health care cost trend rate	7.0%	7.0	%	7.0%	7.1	%	7.0%	6.1	%
Actuarial assumptions used to determine net cost during the year:									
Discount rate - benefit obligation	3.4%	3.1	%	3.0%	2.8	%	3.7%	3.9	%
Discount rate - service cost	3.1%	3.6	%	2.6%	3.2	%	3.4%	4.1	%
Discount rate - interest cost	2.8%	3.0	%	2.4%	2.6	%	2.8%	3.7	%
Initial health care cost trend rate	7.0%	7.1	%	7.0%	6.1	%	6.5%	6.8	%

Cabot uses discount rates as of September 30, the plans' measurement date, to determine future benefit obligations under its U.S. and foreign defined benefit plans. The discount rates for the defined benefit plans in Canada, the Eurozone, Japan, Mexico, Switzerland, the United Arab Emirates, the United Kingdom and the U.S. are derived from yield curves that reflect high quality corporate bond yield or swap rate information in each region and reflect the characteristics of Cabot's employee benefit plans. The discount rates for the defined benefit plans in the Czech Republic and Indonesia are based on government bond indices that best reflect the durations of the plans, adjusted for credit spreads presented in selected AA corporate bond indices. The rates utilized are selected because they represent long-term, high quality, fixed income benchmarks that approximate the long-term nature of Cabot's pension obligations and related payouts.

Amounts recognized in the Consolidated Balance Sheets at September 30, 2018 and 2017 related to the Company's defined benefit pension and postretirement benefit plans were as follows:

	September 30							
	2018		2017		2018		2017	
	Pension Benefits				Postretirement Benefits			
	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign
	(In millions)							
Noncurrent assets	$10	$ 21	$1	$ 12	$—	$ —	$—	$ —
Current liabilities	$—	$ (1)	$(1)	$ (1)	$(3)	$ (1)	$(3)	$ (1)
Noncurrent liabilities	$(4)	$ (70)	$(4)	$ (69)	$(26)	$ (18)	$(30)	$ (19)

Amounts recognized in AOCI at September 30, 2018 and 2017 related to the Company's defined benefit pension and postretirement benefit plans were as follows:

	September 30							
	2018		2017		2018		2017	
	Pension Benefits				Postretirement Benefits			
	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign
	(In millions)							
Net actuarial (gain) loss	$(1)	$ 49	$3	$ 52	$(7)	$ 4	$(6)	$ 5
Net prior service credit	—	(1)	—	(1)	(2)	—	(5)	—
Balance in accumulated other comprehensive income (loss), pretax	$(1)	$ 48	$3	$ 51	$(9)	$ 4	$(11)	$ 5

In fiscal 2019, the Company expects an estimated net loss of $3 million will be amortized from AOCI to net periodic benefit cost. In addition, the Company expects prior service credits of $2 million for other postretirement benefits will be amortized from AOCI to net periodic benefit costs in fiscal 2019.

Estimated Future Benefit Payments

The Company expects that the following benefit payments will be made to plan participants in the years from 2019 to 2028:

	Pension Benefits		Postretirement Benefits	
Years Ending September 30	U.S.	Foreign	U.S.	Foreign
	(In millions)			
2019	$12	$ 14	$ 3	$ 1
2020	$11	$ 13	$ 3	$ 1
2021	$10	$ 17	$ 3	$ 1
2022	$10	$ 15	$ 3	$ 1
2023	$10	$ 15	$ 3	$ 1
2024 - 2028	$48	$ 88	$ 11	$ 4

Postretirement medical benefits are unfunded and impact Cabot’s cash flows as benefits become due, which is expected to be $4 million in fiscal 2019. The Company expects to contribute $8 million to its foreign pension plans in fiscal 2019.

Net periodic defined benefit pension and other postretirement benefit costs include the following components:

Years Ended September 30					
2018	2017	2016	2018	2017	2016
Pension Benefits			Postretirement Benefits		

(In millions)	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign
Service cost	$1	$ 9	$1	$ 10	$1	$ 8	$—	$ —	$—	$ —	$—	$ —
Interest cost	5	7	4	6	4	8	1	1	1	1	1	1
Expected return on plan assets	(10)	(15)	(9)	(14)	(10)	(14)	—	—	—	—	—	—
Amortization of prior service cost	—	—	—	—	—	—	(3)	—	(3)	—	(3)	—
Net losses	—	3	—	5	—	3	(1)	—	—	—	—	—
Settlements or Curtailments cost	—	—	—	—	—	1	—	—	—	—	(1)	—
Net periodic (benefit) cost	$(4)	$ 4	$(4)	$ 7	$(5)	$ 6	$(3)	$ 1	$(2)	$ 1	$(3)	$ 1

Other changes in plan assets and benefit obligations recognized in Other comprehensive income (loss) are as follows:

	Years Ended September 30											
	2018		2017		2016		2018		2017		2016	
	Pension Benefits						Postretirement Benefits					
	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign
	(In millions)											
Net (gains) losses	$(4)	$ —	$(9)	$ (35)	$7	$ 31	$(2)	$ (1)	$(3)	$ (1)	$2	$ 5
Prior service (credit) cost	—	—	—	—	—	—	—	—	—	—	—	—
Amortization of prior service credit	—	—	—	—	—	—	3	—	3	—	3	—
Amortization of prior unrecognized loss	—	(3)	—	(5)	—	(3)	1	—	—	—	—	—
Other	—	—	—	—	—	(1)	—	—	—	—	1	—
Net changes recognized in Total other comprehensive (income) loss [1]	$(4)	$ (3)	$(9)	$ (40)	$7	$ 27	$2	$ (1)	$—	$ (1)	$6	$ 5

[1] The tax impact on pension and other postretirement benefit liability adjustments arising during the period was a tax provision of $1 million, tax provision of $7 million, and tax benefit of $7 million for fiscal years 2018, 2017, and 2016, respectively.

Curtailments and Settlements of Employee Benefit Plans

In recent years, the Company incurred curtailments and settlements of certain of its employee benefit plans. Associated with these curtailments and settlements, the Company recognized net losses of less than $1 million in each of fiscal 2018, 2017 and 2016.

Sensitivity Analysis

Measurement of postretirement benefit expense is based on actuarial assumptions used to value the postretirement benefit liability at the beginning of the year. Assumed health care cost trend rates have an effect on the amounts reported for the health care plans. The fiscal 2018 weighted-average assumed health care cost trend rate is 7.0% for U.S. plans and 7.1 % for foreign plans. A one percentage point change in the 2018 assumed health care cost trend rate would have an immaterial impact to the aggregate of the service and interest cost components of the net periodic postretirement benefit and would have the following effect on the postretirement benefit obligation:

	1-Percentage-Point			
	Increase		Decrease	
	U.S.	Foreign	U.S.	Foreign
	(In millions)			