AIR PRODUCTS & CHEMICALS INC /DE/
Form 10-K
November 16, 2017
Table of Contents

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549
FORM 10-K

x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended 30 September 2017

OR

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

Commission file number 001-04534

AIR PRODUCTS AND CHEMICALS, INC.

7201 Hamilton Boulevard	State of incorporation: Delaware
Allentown, Pennsylvania, 18195-1501	I.R.S. identification number: 23-1274455

Tel. (610) 481-4911

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

Title of Each Class:	Registered on:
Common Stock, par value $1.00 per share	New York Stock Exchange
2.0% Euro Notes due 2020	New York Stock Exchange
0.375% Euro Notes due 2021	New York Stock Exchange
1.0% Euro Notes due 2025	New York Stock Exchange

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

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.	YES x NO ¨
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 x
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.	YES x NO ¨
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).	YES x NO ¨
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.	x

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the 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 x	Accelerated filer ¨	Non-accelerated filer ¨	Smaller reporting company ¨	Emerging growth company ¨

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). YES¨ NOx

The aggregate market value of the voting stock held by non-affiliates of the registrant on 31 March 2017 was approximately $29.3 billion. For purposes of the foregoing calculations, all directors and/or executive officers have been deemed to be affiliates, but the registrant disclaims that any such director and/or executive officer is an affiliate.

The number of shares of common stock outstanding as of 31 October 2017 was 218,618,346.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant’s definitive Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018 are incorporated by reference into Part III.

Table of Contents

AIR PRODUCTS AND CHEMICALS, INC.
ANNUAL REPORT ON FORM 10-K
For the fiscal year ended 30 September 2017
TABLE OF CONTENTS

ITEM 1.	BUSINESS	3
ITEM 1A.	RISK FACTORS	7
ITEM 1B.	UNRESOLVED STAFF COMMENTS	13
ITEM 2.	PROPERTIES	13
ITEM 3.	LEGAL PROCEEDINGS	14
ITEM 4.	MINE SAFETY DISCLOSURES	14
ITEM 5.	MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES	15
ITEM 6.	SELECTED FINANCIAL DATA	17
ITEM 7.	MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS	19
ITEM 7A.	QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK	54
ITEM 8.	FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA	56
ITEM 9.	CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE	123
ITEM 9A.	CONTROLS AND PROCEDURES	123
ITEM 9B.	OTHER INFORMATION	123
ITEM 10.	DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE	123
ITEM 11.	EXECUTIVE COMPENSATION	124
ITEM 12.	SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS	124
ITEM 13.	CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE	125
ITEM 14.	PRINCIPAL ACCOUNTANT FEES AND SERVICES	125
ITEM 15.	EXHIBITS AND FINANCIAL STATEMENT SCHEDULES	126

INDEX TO EXHIBITS	127
SIGNATURES	131

Table of Contents

PART I

ITEM 1 BUSINESS

Air Products and Chemicals, Inc. (“we,” “our,” “us,” the “Company,” “Air Products,” or “registrant”), a Delaware corporation originally founded in 1940, serves energy, electronics, chemicals, metals, and manufacturing customers globally with a unique portfolio of products, services, and solutions that include atmospheric gases, process and specialty gases, equipment, and services. The Company is the world’s largest supplier of hydrogen and has built leading positions in growth markets such as helium and natural gas liquefaction. As used in this report, unless the context indicates otherwise, the terms “we,” “our,” “us,” the “Company,” or “registrant” include controlled subsidiaries, affiliates, and predecessors of Air Products and its controlled subsidiaries and affiliates.

On 1 October 2016, the Company completed the spin-off of its former Electronic Materials business by distributing to Air Products shareholders on a pro rata basis all of the issued and outstanding stock of Versum Materials, Inc. ("Versum"), the entity Air Products incorporated to hold this business, which established Versum as an independent publicly traded corporation. On 3 January 2017, Air Products completed the sale of its Performance Materials business to Evonik Industries AG. The results of operations, financial condition, and cash flows for the Electronic Materials and Performance Materials businesses are presented herein as discontinued operations. On 29 March 2016, the Board of Directors approved the Company's exit of its Energy-from-Waste ("EfW") business and efforts to start up and operate the two EfW projects located in Tees Valley, United Kingdom, were discontinued. Since that time, the EfW segment has been presented as a discontinued operation.

During its fiscal year ended 30 September 2017 (“fiscal year 2017”), the Company reported its continuing operations in five reporting segments under which it managed its operations, assessed performance, and reported earnings: Industrial Gases – Americas; Industrial Gases – EMEA (Europe, Middle East, and Africa); Industrial Gases – Asia; Industrial Gases – Global; and Corporate and other.

Except as otherwise noted, the description of the Company's business below reflects the Company's continuing operations, which excludes the Electronic Materials, Performance Materials, and EfW businesses. Refer to Note 25, Business Segment and Geographic Information, and Note 3, Discontinued Operations, to the consolidated financial statements for additional details on our reportable business segments and our discontinued operations.

Industrial Gases Business

The Company’s Industrial Gases business produces atmospheric gases (oxygen, nitrogen, argon, and rare gases); process gases (hydrogen, helium, carbon dioxide, carbon monoxide, syngas, and specialty gases); and equipment for the production or processing of gases, such as air separation units and non-cryogenic generators. Atmospheric gases are produced through various air separation processes of which cryogenic is the most prevalent. Process gases are produced by methods other than air separation. For example, hydrogen is produced by steam methane reforming of natural gas or by purifying byproduct sources obtained from the chemical and petrochemical industries; and helium is produced as a byproduct of gases extracted from underground reservoirs, primarily natural gas, but also carbon dioxide purified before resale.

The Company’s Industrial Gases business is organized and operated regionally. The regional Industrial Gases segments (Americas, EMEA, and Asia) supply gases and related equipment in the relevant region to diversified customers in many industries, including those in metals, glass, chemical processing, electronics, energy production and refining, food processing, medical, and general manufacturing. Hydrogen is used by refiners to facilitate the conversion of heavy crude feedstock and lower the sulfur content of gasoline and diesel fuels. The chemicals industry uses hydrogen, oxygen, nitrogen, carbon monoxide, and syngas as feedstocks in the production of many basic chemicals. The energy production industry uses nitrogen injection for enhanced recovery of oil and natural gas and oxygen for gasification. Oxygen is used in combustion and industrial heating applications, including in the steel, certain nonferrous metals, glass, and cement industries. Nitrogen applications are used in food processing for freezing and preserving flavor and nitrogen for inerting is used in various fields, including the metals, chemical, and semiconductor industries. Helium is used in laboratories and healthcare for cooling and in other industries for pressurizing, purging, and lifting. Argon is used in the metals and other industries for its unique inerting, thermal conductivity, and other properties. Industrial gases are also used in welding and providing healthcare and are utilized in various

manufacturing processes to make them more efficient and to optimize performance.

Table of Contents

We distribute gases to our customers through a variety of supply modes:
Liquid Bulk—Product is delivered in bulk (in liquid or gaseous form) by tanker or tube trailer and stored, usually in its liquid state, in equipment designed and installed typically by the Company at the customer’s site for vaporizing into a gaseous state as needed. Liquid bulk sales are usually governed by three- to five-year contracts.
Packaged Gases—Small quantities of product are delivered in either cylinders or dewars. The Company operates packaged gas businesses in Europe, Asia, and Latin America. In the United States, the Company’s packaged gas business sells products (principally helium) only for the electronics and magnetic resonance imaging industries.
On-Site Gases—Large quantities of hydrogen, nitrogen, oxygen, carbon monoxide, and syngas (a mixture of hydrogen and carbon monoxide) are provided to customers, principally the energy production and refining, chemical, and metals industries worldwide who require large volumes of gases that have relatively constant demand. Gases are produced at large facilities located adjacent to customers’ facilities or by pipeline systems from centrally located production facilities and are generally governed by 15- to 20- year contracts. The Company also delivers small quantities of product through small on-site plants (cryogenic or non-cryogenic generators), typically either via a 10- to 15- year sale of gas contract or through the sale of the equipment to the customer.
Electricity is the largest cost component in the production of atmospheric gases, and natural gas is the principal raw material for hydrogen, carbon monoxide, and syngas production. We mitigate electricity and natural gas price fluctuations contractually through pricing formulas, surcharges, and cost pass-through arrangements. During fiscal year 2017, no significant difficulties were encountered in obtaining adequate supplies of power and natural gas.
The Company obtains helium from a number of sources globally, including crude helium for purification from the U.S. Bureau of Land Management's helium reserve. Qatar is a significant supplier of helium globally, providing over 25% of the world's supply. During 2017, multiple Arab states cut diplomatic ties with and closed their borders to Qatar, disrupting helium production and transportation for several weeks. Air Products' helium business was not materially affected during this initial phase of the embargo due to its diverse sourcing of crude helium, but customer demand exceeded supply during this period and supply challenges may recur prior to resolution of the embargo.
The regional Industrial Gases segments also include our share of the results of several joint ventures accounted for by the equity method. The largest of these joint ventures operate in Mexico, Italy, South Africa, India, Saudi Arabia, and Thailand.
Each of the regional Industrial Gases segments competes against three global industrial gas companies: Air Liquide S.A., Linde AG, and Praxair, Inc.; as well as regional competitors. Competition in Industrial Gases is based primarily on price, reliability of supply, and the development of industrial gas applications. In locations where we have pipeline networks, which enable us to provide reliable and economic supply of products to larger customers, we derive a competitive advantage.
Overall regional industrial gases sales constituted approximately 90% of consolidated sales in fiscal year 2017, 90% in fiscal year 2016, and 92% in fiscal year 2015. Sales of tonnage hydrogen and related products constituted approximately 24% of consolidated sales in fiscal year 2017, 21% in fiscal year 2016, and 24% in fiscal year 2015. Sales of atmospheric gases constituted approximately 45% of consolidated sales in fiscal year 2017, 46% in fiscal year 2016 and 45% in fiscal year 2015.
Industrial Gases Equipment
The Company designs and manufactures equipment for air separation, hydrocarbon recovery and purification, natural gas liquefaction ("LNG"), and liquid helium and liquid hydrogen transport and storage. The Industrial Gases–Global segment includes cryogenic and non-cryogenic equipment for air separation. The equipment is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. The Corporate and other segment includes two global equipment businesses, our LNG equipment business, and our liquid helium and liquid hydrogen transport and storage containers business. Steel, aluminum, and capital equipment subcomponents (compressors, etc.) are the principal raw materials in the manufacturing of equipment. Adequate raw materials for individual projects are acquired under firm purchase agreements. Equipment is produced at the Company’s manufacturing sites with certain components being procured from subcontractors and vendors. Competition in the equipment business is based primarily on technological performance, service, technical know-how, price, and performance guarantees. Sale of equipment constituted

approximately 10% of consolidated sales in fiscal year 2017, 10% in fiscal year 2016, and 8% in fiscal year 2015.

Table of Contents

The backlog of equipment orders was approximately $.5 billion on 30 September 2017 (as compared with a total backlog of approximately $1.1 billion on 30 September 2016) and primarily contains Air Products' share of the multi-year contract with a joint venture in Jazan, Saudi Arabia, for the construction of an industrial gas facility that will supply gases to Saudi Arabian Oil Company ("Saudi Aramco"). Revenue from this contract is recognized under the percentage-of-completion method based on costs incurred to date compared with total estimated costs to be incurred. The Company estimates that approximately 80% of the total sales backlog as of 30 September 2017 will be recognized as revenue during fiscal year 2018, dependent on execution schedules of the relevant projects.

International Operations

The Company, through subsidiaries, affiliates, and less-than-controlling interests, conducts business in 50 countries outside the United States. Its international businesses are subject to risks customarily encountered in foreign operations, including fluctuations in foreign currency exchange rates and controls; import and export controls; and other economic, political, and regulatory policies of local governments described in Item 1A, Risk Factors, below.

The Company has majority or wholly owned foreign subsidiaries that operate in Canada; 17 European countries (including the United Kingdom, the Netherlands, and Spain); 11 Asian countries (including China, South Korea, and Taiwan); 8 Latin American countries (including Chile and Brazil); 3 African countries; and 2 Middle Eastern countries. The Company also owns less-than-controlling interests in entities operating in Europe, Asia, Africa, the Middle East, and Latin America (including Italy, Germany, China, India, Saudi Arabia, Thailand, Oman, South Africa, and Mexico).

Financial information about the Company's foreign operations and investments is included in Note 8, Summarized Financial Information of Equity Affiliates; Note 22, Income Taxes; and Note 25, Business Segment and Geographic Information, to the consolidated financial statements included under Item 8, below. Information about foreign currency translation is included under “Foreign Currency” in Note 1, Major Accounting Policies, and information on the Company's exposure to currency fluctuations is included in Note 13, Financial Instruments, to the consolidated financial statements, included under Item 8, below, and in “Foreign Currency Exchange Rate Risk,” included under Item 7A, below. Export sales from operations in the United States to third-party customers amounted to $64.2 million, $134.9 million, and $231.5 million in fiscal years 2017, 2016, and 2015, respectively.

Technology Development

The Company pursues a market-oriented approach to technology development through research and development, engineering, and commercial development processes. It conducts research and development principally in its laboratories located in the United States (Trexlertown, Pennsylvania); Canada (Vancouver); the United Kingdom (Basingstoke and Carrington); Spain (Barcelona); and China (Shanghai). The Company also funds and cooperates in research and development programs conducted by a number of major universities and undertakes research work funded by others, principally the United States government.

The Company's research groups are aligned with and support the research efforts of various businesses throughout the Company. Development of technology for use within the Industrial Gases business focuses primarily on new and improved processes and equipment for the production and delivery of industrial gases and new or improved applications for industrial gas products.

Research and development expenditures were $57.8 million during fiscal year 2017, $71.6 million during fiscal year 2016, and $76.4 million in fiscal year 2015. Amounts expended on customer sponsored research activities were immaterial.

During fiscal year 2017, the Company owned approximately 532 United States patents, approximately 2,544 foreign patents, and was a licensee under certain patents owned by others. While the patents and licenses are considered important, the Company does not consider its business as a whole to be materially dependent upon any particular patent, patent license, or group of patents or licenses.

Environmental Controls

The Company is subject to various environmental laws and regulations in the countries in which it has operations. Compliance with these laws and regulations results in higher capital expenditures and costs. In the normal course of business, the Company is involved in legal proceedings under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA", the federal Superfund law); Resource Conservation and Recovery Act

(RCRA); and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. The Company's accounting policy for environmental expenditures is discussed in Note 1, Major Accounting Policies, and environmental loss contingencies are discussed in Note 17, Commitments and Contingencies, to the consolidated financial statements, included under Item 8, below.

Table of Contents

The amounts charged to income from continuing operations related to environmental matters totaled $11.4 million in fiscal year 2017, $12.2 million in fiscal 2016, and $11.8 million in 2015. These amounts represent an estimate of expenses for compliance with environmental laws and activities undertaken to meet internal Company standards. Refer to Note 17, Commitments and Contingencies, to the consolidated financial statements for additional information.

The Company estimates that we spent approximately $7 million in 2017, $3 million in 2016, and $2 million in 2015 on capital projects reflected in continuing operations to control pollution. Capital expenditures to control pollution in future years are estimated to be approximately $3 million in both 2018 and 2019.

Employees

On 30 September 2017, the Company (including majority-owned subsidiaries) had approximately 15,300 employees, of whom approximately 15,000 were full-time employees and of whom approximately 10,800 were located outside the United States. The Company has collective bargaining agreements with unions at various locations that expire on various dates over the next four years. The Company considers relations with its employees to be satisfactory.

Available Information

All periodic and current reports, registration statements, and other filings that the Company is required to file with the Securities and Exchange Commission ("SEC"), including the Company’s annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) of the Securities Exchange Act of 1934 (the "Exchange Act"), are available free of charge through the Company’s website at www.airproducts.com. Such documents are available as soon as reasonably practicable after electronic filing of the material with the SEC. All such reports filed during the period covered by this report were available on the Company’s website on the same day as filing.

The public may also read and copy any materials filed by the Company with the SEC at the SEC’s Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC maintains a website that contains reports, proxy, and information statements, and other information regarding issuers that file electronically with the SEC. The address of that site is www.sec.gov.

Seasonality

The Company’s businesses are not subject to seasonal fluctuations to any material extent.

Inventories

The Company maintains limited inventory where required to facilitate the supply of products to customers on a reasonable delivery schedule. Inventory consists primarily of crude helium, industrial gas, and specialty gas inventories supplied to customers through liquid bulk and packaged gases supply modes.

Customers

We do not have a homogeneous customer base or end market, and no single customer accounts for more than 10% of our consolidated revenues. We do have concentrations of customers in specific industries, primarily refining, chemicals, and electronics. Within each of these industries, the Company has several large-volume customers with long-term contracts. A negative trend affecting one of these industries, or the loss of one of these major customers, although not material to our consolidated revenue, could have an adverse impact on our financial results.

Governmental Contracts

Our business is not subject to a government entity’s renegotiation of profits or termination of contracts that would be material to our business as a whole.

Table of Contents

Executive Officers of the Company

The Company's executive officers and their respective positions and ages on 16 November 2017 follow. Information with respect to offices held is stated in fiscal years.

Name	Age	Office
M. Scott Crocco	53	Executive Vice President and Chief Financial Officer (became Executive Vice President and Chief Financial Officer in 2016; Senior Vice President and Chief Financial Officer in 2013; and Vice President and Corporate Controller in 2008).
Russell A. Flugel	48	Vice President, Corporate Controller and Principal Accounting Officer (became Vice President, Corporate Controller and Principal Accounting Officer in 2015; Corporate Controller in 2014; Director, Accounting and Corporate Decision Support in 2013; and Director, Corporate Decision Support, Technical Accounting and Consolidation in 2011).
Seifi Ghasemi	73	Chairman, President, and Chief Executive Officer (became Chairman, President and Chief Executive Officer in 2014 and previously served as Chairman and Chief Executive Officer of Rockwood Holdings, Inc. beginning in 2001). Mr. Ghasemi is a member and Chairman of the Board of Directors and the Chairman of the Executive Committee of the Board of Directors.
Jennifer L. Grant	45	Vice President and Chief Human Resources Officer (became Vice President and Chief Human Resources Officer in 2013). Prior to joining Air Products, was Vice President of Human Resources for Pfizer Inc. Specialty Products and Oncology Divisions from 2009-2013.
Sean D. Major	53	Executive Vice President and General Counsel (since May, 2017). Previously, Mr. Major served as Executive Vice President, General Counsel and Secretary for Joy Global since 2007.
Corning F. Painter	55	Executive Vice President Industrial Gases (became Executive Vice President Industrial Gases in 2015; Senior Vice President and General Manager –Merchant Gases in 2014; Senior Vice President – Supply Chain in 2012; and Senior Vice President –Corporate Strategy and Technology in 2011.
Dr. Samir Serhan	56	Executive Vice President (since December, 2016). Previously, Dr. Serhan served as President, Global HyCO, since 2014 for Praxair Inc. From 2000-2014, he worked in leadership positions in the U.S. and Germany for The Linde Group.

ITEM 1A. RISK FACTORS

Our operations are affected by various risks, many of which are beyond our control. In evaluating investment in the Company and the forward-looking information contained in this Annual Report on Form 10-K or presented elsewhere by management from time to time, you should consider the following risk factors. Any of the following risks could have a material adverse effect on our business, operating results, financial condition, and the actual outcome of matters as to which forward-looking statements are made and could adversely affect the value of an investment in our common stock as well. While we believe we have identified and discussed below the key risk factors affecting our business, there may be additional risks and uncertainties that adversely affect our business, performance, or financial condition in the future that are not presently known, are not currently believed to be significant, or are not identified below because they are common to all businesses.

Unfavorable conditions in the global economy, the markets we serve, or the financial markets, may decrease the demand for our goods and services and adversely impact our revenues, operating results, and cash flows.

Demand for the Company's products and services depends in part on the general economic conditions affecting the countries and markets in which the Company does business. Weak economic conditions in certain geographies and changing supply and demand balances in markets served by the Company have impacted in the past and may impact in the future demand for the Company's products and services, in turn negatively impacting the Company's revenues

and earnings. Unfavorable conditions can depress sales, affect our margins, constrain our operating flexibility, impact efficient utilization of the Company's manufacturing capacity, or result in charges which are unusual or nonrecurring. Excess capacity in the Company's or its competitors' manufacturing facilities can decrease the Company's ability to maintain pricing and generate profits.

Table of Contents

Our operating results in one or more segments may also be affected by uncertain or deteriorating economic conditions particularly germane to that segment or to particular customer markets within that segment. A decline in the industries served by our customers or adverse events or circumstances affecting individual customers can impair the ability of such customers to satisfy their obligations to the Company, resulting in uncollected receivables, unanticipated contract terminations, project delays, or inability to recover plant investments negatively impacting our financial results. Weak overall demand or specific customer conditions may also cause customer shutdowns or default, or other inabilities to operate facilities profitably, and may force sale or abandonment of facilities and equipment or prevent projects from coming on-stream. These or other events associated with weak economic conditions or specific end market, product, or customer events may require the Company to record an impairment on tangible assets, such as facilities and equipment, or intangible assets, such as intellectual property or goodwill, which would have a negative impact on our financial results.

Our extensive international operations can be adversely impacted by operational, economic, political, security, legal risks, and currency translation, that could decrease profitability.

In 2017, over 60% of our sales were derived from customers outside the United States and many of our operations, suppliers, and employees are located outside the United States. Our growth strategy depends in part on our ability to further penetrate markets outside the United States, particularly in high-growth markets. Our operations in foreign jurisdictions may be subject to risks including exchange control regulations, import and trade restrictions, and trade policy and other potentially detrimental domestic and foreign governmental practices or policies affecting U.S. companies doing business abroad. Changing economic and political conditions within foreign jurisdictions, strained relations between countries, or imposition of international sanctions can cause fluctuations in demand, price volatility, supply disruptions, or loss of property. The occurrence of any of these risks could have a material adverse impact on our financial condition, results of operation, and cash flows.

We are actively investing significant capital and other resources in developing markets, which present special risks, including through joint ventures. Our developing market operations may be subject to greater risks than those faced by our operations in mature economies, including political and economic instability, project delay or abandonment due to unanticipated government actions, inadequate investment in infrastructure, undeveloped property rights and legal systems, unfamiliar regulatory environments, relationships with local partners, language and cultural differences and talent risks. Our contractual relationship within these jurisdictions may be subject to cancellation without full compensation for loss. Successful operation of particular facilities or projects may be disrupted by civil unrest, acts of sabotage or terrorism, and other local security concerns. Such concerns may require us to incur greater costs for security or to shut down operations for a period of time.

Because the majority of our revenue is generated from sales outside the United States, we are exposed to fluctuations in foreign currency exchange rates. Our business is primarily exposed to translational currency risk as the results of our foreign operations are translated into U.S. dollars at current exchange rates throughout the fiscal period. Our policy is to minimize cash flow volatility from changes in currency exchange rates. We choose not to hedge the translation of our foreign subsidiaries' earnings into dollars. Accordingly, reported sales, net earnings, cash flows, and fair values have been and in the future will be affected by changes in foreign exchange rates. For a more detailed discussion of currency exposure, see Item 7A - Quantitative and Qualitative Disclosures About Market Risk, below.

Operational and project execution risks may adversely affect our operations or financial results.

The operation of our facilities, pipelines, and delivery systems inherently entails hazards that require continuous oversight and control, such as pipeline leaks and ruptures, fire, explosions, toxic releases, mechanical failures, or vehicle accidents. If operational risks materialize, they could result in loss of life, damage to the environment, or loss of production, all of which could negatively impact our ongoing operations, reputation, financial results, and cash flows. In addition, our operating results are dependent on the continued operation of our production facilities and our ability to meet customer requirements, which depends, in part, on our ability to properly maintain and replace aging assets.

Some of our projects involve challenging engineering, procurement and construction phases that may occur over extended time periods, sometimes up to several years. We may encounter difficulties in engineering, delays in designs or materials provided by the customer or a third party, equipment and materials delivery delays, schedule changes, delays from customer failure to timely obtain regulatory permits and rights-of-way, inability to find adequate sources of labor in the geographies where we are building new plants, weather-related delays, delays by subcontractors in completing their portion of the project and other factors, some of which are beyond our control, but which may impact our ability to complete a project within the original delivery schedule. In some cases, delays and additional costs may be substantial, and we may be required to cancel a project and/or compensate the customer for the delay. We may not be able to recover any of these costs. These factors could also negatively impact our reputation or relationships with our customers, which could adversely affect our ability to secure new contracts.

We are subject to extensive government regulation in jurisdictions around the globe in which we do business. Regulations addressing, among other things, environmental compliance, import/export restrictions, anti-bribery and corruption, and taxes, can negatively impact our financial condition, results of operation, and cash flows.

We are subject to government regulation in the United States and foreign jurisdictions in which we conducts our business. The application of laws and regulations to our business is sometimes unclear. Compliance with laws and regulations may involve significant costs or require changes in business practice that could result in reduced profitability. Determination of noncompliance can result in penalties or sanctions that could also impact financial results. Compliance with changes in laws or regulations can require additional capital expenditures or increase operating costs. Export controls or other regulatory restrictions could prevent us from shipping our products to and from some markets or increase the cost of doing so. Changes in tax laws and regulations and international tax treaties could affect the financial results of our businesses. Increasingly aggressive enforcement of anti-bribery and anti-corruption requirements, including the U.S. Foreign Corrupt Practices Act, the United Kingdom Bribery Act and the China Anti-Unfair Competition Law, could subject us to criminal or civil sanctions if a violation occurs. In addition, we are subject to laws and sanctions imposed by the U.S. or by other jurisdictions where we do business that may prohibit us or certain of our affiliates from doing business in certain countries, or restricting the kind of business that may be conducted. Such restrictions may provide a competitive advantage to competitors who are not subject to comparable restrictions or prevent us from taking advantage of growth opportunities.

Further, we cannot guarantee that our internal controls and compliance systems will always protect us from acts committed by employees, agents or our business partners (or of businesses we acquire or partner with) that would violate U.S. and/or non-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, export and import compliance, money laundering and data privacy. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the United States and in other jurisdictions and related shareholder lawsuits, could lead to substantial civil and criminal, monetary and non-monetary penalties and could cause us to incur significant legal and investigatory fees. In addition, the government may seek to hold us liable as a successor for violations committed by companies in which we invest or that we acquire.

We may be unable to successfully execute or effectively integrate acquisitions, or effectively disentangle divested businesses.

Our ability to grow revenue, earnings, and cash flow at anticipated rates depends in part on our ability to identify, successfully acquire and integrate businesses and assets at appropriate prices; and realize expected synergies and operating efficiencies. We may not be able to complete transactions on favorable terms, on a timely basis or at all. In addition, our results of operations and cash flows may be adversely impacted by the failure of acquired businesses or assets to meet expected returns, the failure to integrate acquired businesses, the inability to dispose of non-core assets and businesses on satisfactory terms and conditions, and the discovery of unanticipated liabilities or other problems in acquired businesses or assets for which we lack contractual protections or insurance. We may incur asset impairment charges related to acquisitions that do not meet expectations.

We continually assess the strategic fit of our existing businesses and may divest businesses that are deemed not to fit with our strategic plan or are not achieving the desired return on investment. These transactions pose risks and challenges that could negatively impact our business and financial statements. For example, when we decide to sell or

otherwise dispose of a business or assets, we may be unable to do so on satisfactory terms within our anticipated time frame or at all. In addition, divestitures or other dispositions may dilute our earnings per share, have other adverse financial and accounting impacts and distract management, and disputes may arise with buyers. In addition, we have agreed and may in the future agree to indemnify buyers against known and unknown contingent liabilities. Our financial results could be impacted by claims under these indemnities.

Table of Contents

The security of our Information Technology systems could be compromised, which could adversely affect our ability to operate.

We depend on information technology to enable us to operate efficiently and interface with customers as well as to maintain financial accuracy and efficiency. Our information technology capabilities are delivered through a combination of internal and external services and service providers. If we do not allocate and effectively manage the resources necessary to build and sustain the proper technology infrastructure, we could be subject to transaction errors, processing inefficiencies, the loss of customers, business disruptions, or the loss of or damage to our confidential business information or multiple site impact through a security breach. In addition, these systems may be damaged, disrupted or shut down due to attacks by computer hackers, computer viruses, employee error or malfeasance, power outages, hardware failures, telecommunication or utility failures, catastrophes or other unforeseen events, and in any such circumstances our system redundancy and other disaster recovery planning may be ineffective or inadequate. Security breaches of our systems (or the systems of our customers, suppliers or other business partners) could result in the misappropriation, destruction or unauthorized disclosure of confidential information or personal data belonging to us or to our employees, partners, customers or suppliers.

As with most large systems, our information technology systems have in the past been and in the future likely will be subject to computer viruses, malicious codes, unauthorized access and other cyber-attacks, and we expect the sophistication and frequency of such attacks to continue to increase. To date, we are not aware of any significant impact on our operations or financial results from such attempts; however, unauthorized access could disrupt our business operations, result in the loss of assets, and have a material adverse effect on our business, financial condition, or results of operations. Any of the attacks, breaches or other disruptions or damage described above could interrupt our operations, delay production and shipments, result in theft of our and our customers' intellectual property and trade secrets, damage customer and business partner relationships and our reputation, or result in defective products or services, legal claims and proceedings, liability and penalties under privacy laws and increased costs for security and remediation, each of which could adversely affect our business, reputation and financial statements.

Our business involves the use, storage, and transmission of information about our employees, vendors, and customers. The protection of such information, as well as our information, is critical to us. The regulatory environment surrounding information security and privacy is increasingly demanding, with the frequent imposition of new and constantly changing requirements. We have established policies and procedures to help protect the security and privacy of this information. We also, from time to time, export sensitive customer data and technical information to recipients outside the United States. Breaches of our security measures or the accidental loss, inadvertent disclosure, or unapproved dissemination of proprietary information or sensitive or confidential data about us or our customers, including the potential loss or disclosure of such information or data as a result of fraud, trickery, or other forms of deception, could expose us, our customers, or the individuals affected to a risk of loss or misuse of this information, result in litigation and potential liability for us, damage our reputation, or otherwise harm our business.

Interruption in ordinary sources of raw material or energy supply or an inability to recover increases in energy and raw material costs from customers could result in lost sales or reduced profitability.

Hydrocarbons, including natural gas, are the primary feedstock for the production of hydrogen, carbon monoxide, and syngas. Energy, including electricity, natural gas, and diesel fuel for delivery trucks, is the largest cost component of our business. Because our industrial gas facilities use substantial amounts of electricity, energy price fluctuations could materially impact our revenues and earnings. A disruption in the supply of energy, components, or raw materials, whether due to market conditions, legislative or regulatory actions, natural events, or other disruption, could prevent us from meeting our contractual commitments, harming our business and financial results.

Our supply of crude helium for purification and resale is largely dependent upon natural gas production by crude helium suppliers. Lower natural gas production resulting from natural gas pricing dynamics, supplier operating or transportation issues (such as the Qatar embargo) or other interruptions in sales from crude helium suppliers, can reduce our supplies of crude helium available for processing and resale to customers.

We typically contract to pass through cost increases in energy and raw materials to customers, but cost variability can still have a negative impact on our results. We may be unable to raise prices as quickly as costs rise, or competitive pressures may prevent full recovery. Increases in energy or raw material costs that cannot be passed on to customers

for competitive or other reasons would negatively impact our revenues and earnings. Even where costs are passed through, price increases can cause lower sales volume.

Table of Contents

Catastrophic events could disrupt our operations or the operations of our suppliers or customers, having a negative impact on our business, financial results, and cash flows.

Our operations could be impacted by catastrophic events outside our control, including severe weather conditions such as hurricanes, floods, earthquakes, storms, epidemics, or acts of war and terrorism. Any such event could cause a serious business disruption that could affect our ability to produce and distribute products and possibly expose it to third-party liability claims. Additionally, such events could impact our suppliers or customers, in which event energy and raw materials may be unavailable to us, or our customers may be unable to purchase or accept our products and services. Any such occurrence could have a negative impact on our operations and financial results.

New technologies create performance risks that could impact our financial results or reputation.

We are continually developing and implementing new technologies and product offerings. Existing technologies are being implemented in products and designs or at scales beyond our experience base. These technological expansions can create nontraditional performance risks to our operations. Failure of the technologies to work as predicted or unintended consequences of new designs or uses could lead to cost overruns, project delays, financial penalties, or damage to our reputations. Large scale gasification projects may contain processes or technologies that we have not operated at the same scale or in the same combination and, although such projects generally include technologies and processes that have been demonstrated previously by others, such technologies or processes may be new to us.

Our financial results may be affected by various legal and regulatory proceedings, including those involving antitrust, tax, environmental, or other matters.

We are subject to litigation and regulatory investigations and proceedings in the normal course of business and could become subject to additional claims in the future, some of which could be material. While we seek to limit our liability in our commercial contractual arrangements, there are no guarantees that each contract will contain suitable limitations of liability or that limitations of liability will be enforceable at law. Also, the outcome of existing legal proceedings may differ from our expectations because the outcomes of litigation, including regulatory matters, are often difficult to predict reliably. Various factors or developments can lead us to change current estimates of liabilities and related insurance receivables, where applicable, or make such estimates for matters previously not susceptible to reasonable estimates, such as a significant judicial ruling or judgment, a significant settlement, significant regulatory developments, or changes in applicable law. A future adverse ruling, settlement, or unfavorable development could result in charges that could have a material adverse effect on our financial condition, results of operations, and cash flows in any particular period.

Costs and expenses resulting from compliance with environmental regulations may negatively impact our operations and financial results.

We are subject to extensive federal, state, local, and foreign environmental and safety laws and regulations concerning, among other things, emissions in the air; discharges to land and water; and the generation, handling, treatment, and disposal of hazardous waste and other materials. We take our environmental responsibilities very seriously, but there is a risk of environmental impact inherent in our manufacturing operations and transportation of our products. Future developments and more stringent environmental regulations may require us to make additional unforeseen environmental expenditures. In addition, laws and regulations may require significant expenditures for environmental protection equipment, compliance, and remediation. These additional costs may adversely affect financial results. For a more detailed description of these matters, see Item 1 - Business Environmental Controls, above.

Table of Contents

Legislative, regulatory and societal responses to global climate change create financial risk.
We are the world's leading supplier of hydrogen, the primary use of which is the production of ultra-low sulfur transportation fuels that have significantly reduced transportation emissions and helped improve human health. To make the high volumes of hydrogen needed by our customers, we use steam methane reforming, which releases carbon dioxide. Some of our operations are within jurisdictions that have or are developing regulatory regimes governing emissions of greenhouse gases ("GHG"), including carbon dioxide. These include existing coverage under the European Union Emission Trading Scheme, California and Ontario cap and trade schemes, Alberta's Specified Gas Emitters Regulation, China's Emission Trading Scheme pilots, South Korea's Emission Trading Scheme, and mandatory reporting and anticipated constraints on GHG emissions under an Ontario cap and trade scheme, nation-wide expansion of the China Emission Trading Scheme, and revisions to the Alberta regulation. In addition, the U.S. Environmental Protection Agency ("EPA") requires mandatory reporting of GHG emissions and is regulating GHG emissions for new construction and major modifications to existing facilities. Some jurisdictions have various mechanisms to target the power sector to achieve emission reductions, which often result in higher power costs. Increased public concern may result in more international, U.S. federal, and/or regional requirements to reduce or mitigate the effects of GHG. Although uncertain, these developments could increase our costs related to consumption of electric power and hydrogen production. We believe it will be able to mitigate some of the increased costs through contractual terms, but the lack of definitive legislation or regulatory requirements prevents an accurate estimate of the long-term impact these measures will have on our operations. Any legislation that limits or taxes GHG emissions could negatively impact our growth, increase our operating costs, or reduce demand for certain of our products.
Implementation of the United Kingdom's ("UK") exit from European Union ("EU") membership, or recent political instability in Spain, could adversely affect our European Operations.
The UK's exit from EU membership may adversely affect customer demand, our relationships with customers and suppliers and our European business. Although it is unknown what the terms of the United Kingdom's future relationship with the EU will be, it is possible that there will be greater restrictions on imports and exports between the United Kingdom and EU members and increased regulatory complexities. Any of these factors could adversely affect customer demand, our relationships with customers and suppliers and our European business.
In addition, there has been recent political instability in Catalonia, Spain. We maintain an administrative office in Catalonia which provides transactional accounting and other support services for our entire European business, and fiscal year 2017 sales of approximately US$320 million were attributable to Spain. These operations could be impacted by the outcome of the current unrest.
Inability to compete effectively in a segment could adversely impact sales and financial performance.
We face strong competition from several large global competitors and many smaller regional ones in many of our business segments. Introduction by competitors of new technologies, competing products, or additional capacity could weaken demand for or impact pricing of our products, negatively impacting financial results. In addition, competitors' pricing policies could affect our profitability or market share.
The Company could be subject to changes in its tax rates, the adoption of new U.S. or foreign tax legislation or exposure to additional tax liabilities.
The multinational nature of our business subjects us to taxation in the United States and numerous foreign jurisdictions. Due to economic and political conditions, tax rates in various jurisdictions may be subject to significant change. The company's future effective tax rates could be affected by changes in the mix of earnings in countries with differing statutory tax rates, changes in the valuation of deferred tax assets and liabilities, or changes in tax laws or their interpretation. For example, the United States Congress is considering comprehensive tax reform which, among other things, may significantly reduce the corporate tax rate and change certain U.S. tax rules impacting the way U.S. based multinationals are taxed on foreign income. Changes to the tax system in the United States, particularly a proposed mandatory deemed repatriation tax, could have a material impact to our financial statements. The cumulative undistributed earnings that are considered to be indefinitely reinvested in foreign subsidiaries and corporate joint ventures on the consolidated balance sheets amounted to $6,032.5 as of 30 September 2017. The potential impact of the mandatory deemed repatriation proposal and other proposals is uncertain at this time, especially as the outcome of U.S. tax reform discussions is unknown. At this time, we are properly reflecting the provision for taxes on income

using all current enacted global tax laws in every jurisdiction in which we operate.

Table of Contents

We could incur significant liability if the distribution of Versum common stock to our stockholders is determined to be a taxable transaction.

We have received an opinion from outside tax counsel to the effect that the spin-off of Versum qualifies as a transaction that is described in Sections 355(a) and 368(a)(1)(D) of the Internal Revenue Code. The opinion relies on certain facts, assumptions, representations and undertakings from Versum and us regarding the past and future conduct of the companies' respective businesses and other matters. If any of these facts, assumptions, representations or undertakings are incorrect or not satisfied, our shareholders and we may not be able to rely on the opinion of tax counsel and could be subject to significant tax liabilities. Notwithstanding the opinion of tax counsel we have received, the IRS could determine on audit that the spin-off is taxable if it determines that any of these facts, assumptions, representations or undertakings are not correct or have been violated or if it disagrees with the conclusions in the opinion. If the spin-off is determined to be taxable for U.S. federal income tax purposes, our shareholders that are subject to U.S. federal income tax and we could incur significant U.S. federal income tax liabilities.

ITEM 1B. UNRESOLVED STAFF COMMENTS

We have not received any written comments from the Commission staff that remain unresolved.

ITEM 2. PROPERTIES

Air Products and Chemicals, Inc. owns its principal administrative offices, which are the Company's headquarters located in Trexlertown, Pennsylvania, as well as Hersham, England, Shanghai, China, and Santiago, Chile. The Company leases administrative offices in the United States, Spain, Malaysia, and China for its Global Business Support organization.

The following is a description of the properties used by our five business segments. We believe that our facilities are suitable and adequate for our current and anticipated future levels of operation.

Industrial Gases – Americas

This business segment currently operates from over 400 production and distribution facilities in North and South America (approximately $1/4^{th}$ of which are located on owned property), and 10% of which are integrated sites that serve dedicated customers as well as merchant customers. The Company has sufficient property rights and permits for the ongoing operation of our pipeline systems in the Gulf Coast, California, and Arizona in the United States and Alberta and Ontario, Canada. Management and sales support is based in our Trexlertown and Santiago offices referred to above, and at 10 leased properties located throughout North and South America.

Hydrogen fueling stations built by the Company support commercial markets in California and Japan as well as demonstration projects in Europe and other parts of Asia.

Industrial Gases – EMEA

This business segment currently operates from over 150 production and distribution facilities in Europe, the Middle East, and Africa (approximately $1/3^{rd}$ of which are on owned property). The Company has sufficient property rights and permits for the ongoing operation of our pipeline systems in the Netherlands, the United Kingdom, Belgium, France, and Germany. Management and sales support for this business segment is based in Hersham, England referred to above, Barcelona, Spain and at 12 leased regional office sites and at least 15 leased local office sites, located throughout the region.

Industrial Gases – Asia

Industrial Gases – Asia currently operates from over 170 production and distribution facilities within Asia (approximately $1/4^{th}$ of which are on owned property or long duration term grants). The Company has sufficient property rights and permits for the ongoing operation of our pipeline systems in China, South Korea, Taiwan, Malaysia, Singapore, and Indonesia. Management and sales support for this business segment is based in Shanghai, China and Kuala Lumpur, Malaysia, and in 12 leased office locations throughout the region.

Table of Contents

Industrial Gases – Global
Management, sales, and engineering support for this business segment is based in our principal administrative offices noted above, and an office in India.
Equipment is manufactured in Missouri, Pennsylvania, and China.
Research and development ("R&D") activities for this business segment are conducted at owned locations in the U.S. and the United Kingdom, and 4 leased locations in Canada, Europe, and Asia.
Helium is processed at multiple sites in the U.S. and then distributed to/from transfill sites globally.
Corporate and other
Corporate administrative functions are based in the Company's administrative offices referred to above.
The Gardner Cryogenic business operates at facilities in Pennsylvania and Kansas in the United States and in France.
The LNG business operates a manufacturing facility in Florida in the United States with management, engineering, and sales support based in the Trexlertown offices referred to above and a nearby leased office.

ITEM 3. LEGAL PROCEEDINGS

In the normal course of business, the Company and its subsidiaries are involved in various legal proceedings, including contract, product liability, intellectual property, insurance, and regulatory matters. Although litigation with respect to these matters is routine and incidental to the conduct of our business, such litigation could result in large monetary awards, especially if compensatory and/or punitive damages are awarded. However, we believe that litigation currently pending to which we are a party will be resolved without any material adverse effect on our financial position, earnings, or cash flows.

From time to time, we are also involved in proceedings, investigations, and audits involving governmental authorities in connection with environmental, health, safety, competition, and tax matters.

The Company is a party to proceedings under CERCLA, the RCRA, and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Presently there are approximately 32 sites on which a final settlement has not been reached where the Company, along with others, has been designated a potentially responsible party by the Environmental Protection Agency or is otherwise engaged in investigation or remediation, including cleanup activity at certain of its current and former manufacturing sites. We do not expect that any sums we may have to pay in connection with these environmental matters would have a material adverse impact on our consolidated financial position. Additional information on the Company's environmental exposure is included under Item 1 - Business Environmental Controls.

In September 2010, the Brazilian Administrative Council for Economic Defense ("CADE") issued a decision against our Brazilian subsidiary, Air Products Brasil Ltda., and several other Brazilian industrial gas companies for alleged anticompetitive activities. CADE imposed a civil fine of R$179.2 million (approximately $57 million at 30 September 2017) on Air Products Brasil Ltda. This fine was based on a recommendation by a unit of the Brazilian Ministry of Justice, whose investigation began in 2003, alleging violation of competition laws with respect to the sale of industrial and medical gases. The fines are based on a percentage of the Company's total revenue in Brazil in 2003.

We have denied the allegations made by the authorities and filed an appeal in October 2010 to the Brazilian courts. On 6 May 2014, our appeal was granted and the fine against Air Products Brasil Ltda. was dismissed. CADE has appealed that ruling and the matter remains pending. The Company, with advice of its outside legal counsel, has assessed the status of this matter and has concluded that, although an adverse final judgment after exhausting all appeals is possible, such a judgment is not probable. As a result, no provision has been made in the consolidated financial statements.

Other than this matter, we do not currently believe there are any legal proceedings, individually or in the aggregate, that are reasonably possible to have a material impact on our financial condition, results of operations, or cash flows. However, a future charge for regulatory fines or damage awards could have a significant impact on our net income in the period in which it is recorded.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable

Table of Contents

PART II

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

Our common stock (ticker symbol APD) is listed on the New York Stock Exchange. Our transfer agent and registrar is Broadridge Corporate Issuer Solutions, Inc., P.O. Box 1342, Brentwood, New York 11717, telephone (844) 318-0129 (U.S.) or (720) 358-3595 (all other locations); website, http://shareholder.broadridge.com/airproducts; and e-mail address, shareholder@broadridge.com. As of 31 October 2017, there were 5,644 record holders of our common stock.
Quarterly stock prices, as reported on the New York Stock Exchange composite tape of transactions, and dividend information for the last two fiscal years appear below. Cash dividends on the Company's common stock are paid quarterly. It is our expectation that we will continue to pay cash dividends in the future at comparable or increased levels. The Board of Directors determines whether to declare dividends and the timing and amount based on financial condition and other factors it deems relevant.

Quarterly Stock Information

2017	High	Low	Close	Dividend
First	$150.45	$129.00	$143.82	$ .86
Second	149.46	133.63	135.29	.95
Third	147.66	134.09	143.06	.95
Fourth	152.26	141.88	151.22	.95
				$ 3.71

2016	High	Low	Close	Dividend
First	$133.78	$117.80	$121.02	$ .81
Second	136.88	106.63	133.99	.86
Third	141.53	124.78	132.12	.86
Fourth	146.82	127.72	139.84	.86
				$ 3.39

Purchases of Equity Securities by the Issuer

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1.0 billion of our outstanding common stock. This program does not have a stated expiration date. We repurchase shares pursuant to Rules 10b5-1 and 10b-18 under the Securities Exchange Act of 1934, as amended, through repurchase agreements established with several brokers. There were no purchases of stock during fiscal year 2017. At 30 September 2017, $485.3 million in share repurchase authorization remained. Additional purchases will be completed at the Company's discretion while maintaining sufficient funds for investing in its businesses and growth opportunities.

Table of Contents

Performance Graph

The performance graph below compares the five-year cumulative returns of the Company’s common stock with those of the Standard & Poor’s 500 Index (S&P 500 Index) and the Standard & Poor’s 500 Materials Index (S&P 500 Materials Index). The figures assume an initial investment of $100 and the reinvestment of all dividends.

COMPARISON OF FIVE YEAR CUMULATIVE SHAREHOLDER RETURN
Air Products, S&P 500 Index, and S&P 500 Materials Index
Comparative Growth of a $100 Investment
(Assumes Reinvestment of All Dividends)

	Sept 2012	Sept 2013	Sept 2014	Sept 2015	Sept 2016	Sept 2017
Air Products	100	133	170	164	200	223
S&P 500 Index	100	120	143	139	163	194
S&P 500 Materials Index	100	117	142	113	140	171

Table of Contents

ITEM 6. SELECTED FINANCIAL DATA

Unless otherwise indicated, information presented is on a continuing operations basis.

(Millions of dollars, except for share and per share data)	2017[(A)]	2016[(A)]	2015[(A)]	2014[(A)]	2013[(A)]
Operating Results					
Sales	$8,188	$7,504	$7,824	$8,384	$8,313
Cost of sales	5,753	5,177	5,598	6,208	6,138
Selling and administrative	716	685	773	892	896
Research and development	58	72	76	79	74
Business restructuring and cost reduction actions	151	35	180	11	98
Operating income	1,428	1,530	1,233	924	1,149
Equity affiliates' income[(B)]	80	147	152	149	165
Income from continuing operations attributable to Air Products	1,134	1,100	933	697	869
Net income attributable to Air Products[(C)]	3,000	631	1,278	992	994
Basic earnings per common share attributable to Air Products:					
Income from continuing operations	5.20	5.08	4.34	3.28	4.14
Net income[(C)]	13.76	2.92	5.95	4.66	4.74
Diluted earnings per common share attributable to Air Products:					
Income from continuing operations	5.16	5.04	4.29	3.24	4.09
Net income[(C)]	13.65	2.89	5.88	4.61	4.68
Year-End Financial Position					
Plant and equipment, at cost	$19,548	$18,660	$17,999	$18,180	$17,676
Total assets[(C)(D)(E)]	18,467	18,029	17,317	17,648	17,740
Working capital[(C)]	3,388	1,034	(851)	199	100
Total debt[(E)(F)]	3,963	5,211	5,856	6,081	6,231
Redeemable noncontrolling interest	—	—	—	287	376
Air Products shareholders' equity[(C)]	10,086	7,080	7,249	7,366	7,042
Total equity[(C)]	10,186	7,213	7,381	7,521	7,199
Financial Ratios					
Return on average Air Products shareholders' equity[(G)]	13.2%	15.4%	12.7%	9.5%	13.3%
Operating margin	17.4%	20.4%	15.8%	11.0%	13.8%
Selling and administrative as a percentage of sales	8.7%	9.1%	9.9%	10.6%	10.8%
Total debt to total capitalization[(E)(F)(H)]	28.0%	41.9%	44.2%	43.8%	45.1%
Other Data					
Income from continuing operations including noncontrolling interests	$1,155	$1,122	$966	$691	$900
Adjusted EBITDA[(I)]	2,795	2,622	2,399	2,275	2,247
Depreciation and amortization	866	855	859	876	825
Capital expenditures on a GAAP basis[(J)]	1,056	908	1,201	1,297	1,400
Capital expenditures on a non-GAAP basis[(J)]	1,066	935	1,575	1,498	1,642
Cash provided by operating activities	2,534	2,259	2,047	1,862	1,313
Cash used for investing activities	(1,418)	(865)	(1,147)	(1,257)	(1,354)
Cash (used for) provided by financing activities	(2,041)	(860)	(960)	(524)	112
Dividends declared per common share	3.71	3.39	3.20	3.02	2.77
Weighted Average Common Shares – Basic (in millions)	218	216	215	213	210
Weighted Average Common Shares – Diluted (in millions)	220	218	217	215	212
Book value per common share at year-end	$46.19	$32.57	$33.66	$34.49	$33.35
Shareholders at year-end	5,700	6,000	6,400	6,600	7,000
Employees at year-end[(K)]	15,300	18,600	19,700	21,200	21,600

17

(A) Unless otherwise stated, selected financial data is presented on a GAAP basis. Our operating results were impacted by certain items which management does not believe to be indicative of ongoing business trends and are excluded from the non-GAAP measure. Refer to pages 31-37 for reconciliations of the GAAP to non-GAAP measures for fiscal year 2017, 2016, and 2015. Descriptions of the excluded items appear on pages 24-26. For 2014, these items include: (i) a charge to operating income of $11 ($7 after-tax, or $.03 per share) related to business restructuring and cost reduction actions, (ii) pension settlement losses of $5 ($3 after-tax, or $.02 per share), and (iii) a goodwill and intangible asset impairment charge of $310 ($275 attributable to Air Products, after-tax, or $1.27 per share). For 2013, these items include: (i) a charge to operating income of $98 ($71 after-tax, or $.33 per share) related to business restructuring and cost reduction actions, and (ii) expenses of $10 ($6 after-tax, or $.03 per share) related to advisory costs.

(B) For 2017, includes the impact of a noncash impairment charge of $79.5 ($.36 per share) on our investment in Abdullah Hashim Industrial Gases & Equipment Co., Ltd. (AHG), a 25% owned equity affiliate in our Industrial Gases – EMEA segment.

(C) Information presented on a total company basis, which includes both continuing and discontinued operations.

(D) Reflects adoption of guidance on the presentation of deferred income taxes on a retrospective basis. Refer to Note 2, New Accounting Guidance, for additional information.

(E) Reflects adoption of guidance on the presentation of deferred financing costs on a retrospective basis. Refer to Note 2, New Accounting Guidance, for additional information.

(F) Total debt includes long-term debt, current portion of long-term debt, and short-term borrowings as of the end of the year for continuing operations.

(G) Calculated using income from continuing operations attributable to Air Products and five-quarter average Air Products shareholders' equity.

(H) Total capitalization includes total debt for continuing operations plus total equity plus redeemable noncontrolling interest as of the end of the year.

(I) A reconciliation of Income from Continuing Operations on a GAAP basis to Adjusted EBITDA is presented on pages 34-36.

(J) Capital expenditures presented on a GAAP basis include additions to plant and equipment, investment in and advances to unconsolidated affiliates, and acquisitions. The Company utilizes a non-GAAP measure in the computation of capital expenditures and includes spending associated with facilities accounted for as capital leases and purchases of noncontrolling interests. Refer to page 39 for a reconciliation of the GAAP to non-GAAP measures for 2017, 2016, and 2015. For 2014, the GAAP measure was adjusted by $200 for spending associated with facilities accounted for as capital leases. For 2013, the GAAP measure was adjusted by $228 and $14 for spending associated with facilities accounted for as capital leases and purchases of noncontrolling interests, respectively.

(K) Includes full- and part-time employees from continuing and discontinued operations.

Table of Contents

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

Business Overview	20
2017 in Summary	20
2018 Outlook	22
Results of Operations	22
Reconciliation of Non-GAAP Financial Measures	31
Liquidity and Capital Resources	37
Contractual Obligations	41
Pension Benefits	43
Environmental Matters	44
Off-Balance Sheet Arrangements	45
Related Party Transactions	45
Inflation	45
Critical Accounting Policies and Estimates	46
New Accounting Guidance	52
Forward-Looking Statements	53

The following discussion should be read in conjunction with the consolidated financial statements and the accompanying notes contained in this report. All comparisons in the discussion are to the corresponding prior year unless otherwise stated. All amounts presented are in accordance with U.S. generally accepted accounting principles (GAAP), except as noted. All amounts are presented in millions of dollars, except for per share data, unless otherwise indicated.

The results of our former Materials Technologies segment, which contained the Electronic Materials Division (EMD) and the Performance Materials Division (PMD), and the former Energy-from-Waste segment have been presented as discontinued operations. The results of operations and cash flows of these businesses have been removed from the results of continuing operations and segment results for all periods presented. Unless otherwise indicated, financial information is presented on a continuing operations basis. Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information regarding the discontinued businesses.

Captions such as income from continuing operations attributable to Air Products, net income attributable to Air Products, and diluted earnings per share attributable to Air Products are simply referred to as "income from continuing operations," "net income," and "diluted earnings per share (EPS)" throughout this Management's Discussion and Analysis, unless otherwise stated.

The discussion of results that follows includes comparisons to certain non-GAAP ("adjusted") financial measures. The presentation of non-GAAP measures is intended to provide investors, potential investors, securities analysts, and others with useful supplemental information to evaluate the performance of the business because such measures, when viewed together with our financial results computed in accordance with GAAP, provide a more complete understanding of the factors and trends affecting our historical financial performance and projected future results. The reconciliations of reported GAAP results to non-GAAP measures are presented on pages 31-37. Descriptions of the excluded items appear on pages 24-26.

Table of Contents

BUSINESS OVERVIEW

Air Products and Chemicals, Inc. is a world-leading Industrial Gases company in operation for over 75 years. The Company's core industrial gases business provides atmospheric and process gases and related equipment to manufacturing markets, including refining and petrochemical, metals, electronics, and food and beverage. Air Products is also the world's leading supplier of liquefied natural gas process technology and equipment. With operations in 50 countries, in 2017 we had sales of $8.2 billion, total company assets, including assets of both continuing and discontinued operations, of $18.5 billion, and a worldwide workforce of approximately 15,300 full- and part-time employees from continuing and discontinued operations.

As of 30 September 2017, our operations were organized into five reportable business segments: Industrial Gases – Americas; Industrial Gases – EMEA (Europe, Middle East, and Africa); Industrial Gases – Asia; Industrial Gases – Global; and Corporate and other. The financial statements and analysis that follow discuss our results based on these operations. Refer to Note 25, Business Segment and Geographic Information, to the consolidated financial statements for additional details on our reportable business segments.

2017 IN SUMMARY

In 2017, we were able to focus on our core industrial gases business by completing the separation of EMD through the spin-off of Versum Materials, Inc. (Versum) and the sale of PMD to Evonik Industries AG (Evonik). Sales of $8.2 billion increased nine percent over the prior year, primarily due to volume growth from new project onstreams across our regional industrial gases businesses, underlying growth in the base business, and continued progress on the Jazan project within our Industrial Gases – Global segment, partially offset by weaker liquefied natural gas (LNG) equipment sales. We delivered operating margin of 17.4%, adjusted operating margin of 21.6%, and adjusted EBITDA margin of 34.1% as our productivity actions were offset by the impact of energy cost pass-through to customers. Diluted EPS of $5.16 increased 2% from the prior year. On a non-GAAP basis, adjusted diluted EPS of $6.31 increased 12%.

Highlights for 2017

- Sales of $8,187.6 increased 9%, or $683.9 as underlying sales growth of 7% and higher energy and natural gas cost pass through to customers of 3% were partially offset by unfavorable currency impacts of 1%. Underlying sales increased primarily from higher volumes across the industrial gases businesses, including the Jazan project, partially offset by lower LNG sales in the corporate and other segment.
- Operating income of $1,427.6 decreased 7%, or $102.1, primarily due to a noncash goodwill and intangible asset impairment charge and higher cost reduction and asset actions, partially offset by favorable volumes and lower other costs. Operating margin of 17.4% decreased 300 bp. On a non GAAP basis, adjusted operating income of $1,769.6 increased 9%, or $149.7, and adjusted operating margin of 21.6% was flat.
- Adjusted EBITDA of $2,795.0 increased 7%, or $173.5. Adjusted EBITDA margin of 34.1% decreased 80 bp and was negatively impacted by 90 bp from higher contractual energy pass-through to customers. Excluding this impact, adjusted EBITDA margin was up 10 bp.
- Income from continuing operations of $1,134.4 increased 3%, or $34.9, and diluted EPS of $5.16 increased 2%, or $.12. On a non-GAAP basis, adjusted income from continuing operations of $1,385.9 increased 13%, or $155.6, and adjusted diluted EPS of $6.31 increased 12%, or $.67. A summary table of changes in diluted earnings per share, including a non GAAP reconciliation, is presented below.
- We completed the spin-off of EMD as Versum on 1 October 2016.
- We completed the sale of PMD to Evonik on 3 January 2017.
- We entered into an agreement to form a $1.3 billion joint venture in China with Lu'An Clean Energy Company.
- We increased our quarterly dividend by 10% from $.86 to $.95 per share. This represents the 35th consecutive year that we have increased our dividend payment.

Table of Contents

Changes in Diluted Earnings per Share Attributable to Air Products

	2017	2016	Increase (Decrease)
Diluted Earnings per Share			
Net income	$13.65	$2.89	$ 10.76
Income (Loss) from discontinued operations	8.49	(2.15)	10.64
Income from Continuing Operations – GAAP Basis	$5.16	$5.04	$ .12
Operating Income Impact (after-tax)			
Underlying business			
Volume			$ .29
Price/raw materials			.03
Costs			.24
Currency			(.03)
Business separation costs			.09
Business restructuring and cost reduction actions			(.38)
Pension settlement loss			(.01)
Goodwill and intangible asset impairment charge			(.70)
Gain on land sale			.03
Total Operating Income Impact (after-tax)			$ (.44)
Other Impact (after-tax)			
Equity affiliates' income			.04
Equity method investment impairment charge			(.36)
Interest expense			(.02)
Other non-operating income (expense), net			.10
Loss on extinguishment of debt			.02
Income tax			.07
Tax costs associated with business separation			.26
Tax election benefit			.50
Noncontrolling interests			(.01)
Weighted average diluted shares			(.04)
Total Other Impact (after-tax)			$ .56
Total Change in Diluted Earnings per Share from Continuing Operations – GAAP Basis			$ .12

	2017	2016	Increase (Decrease)
Income from Continuing Operations – GAAP Basis	$5.16	$5.04	$ .12
Business separation costs	.12	.21	(.09)
Tax (benefit) costs associated with business separation	(.02)	.24	(.26)
Business restructuring and cost reduction actions	.49	.11	.38
Pension settlement loss	.03	.02	.01
Goodwill and intangible asset impairment charge	.70	—	.70
Gain on land sale	(.03)	—	(.03)
Equity method investment impairment charge	.36	—	.36
Loss on extinguishment of debt	—	.02	(.02)
Tax election benefit	(.50)	—	(.50)
Income from Continuing Operations – Non-GAAP Basis	$6.31	$5.64	$ .67

Table of Contents

2018 OUTLOOK

In 2018, we intend to build on our strong fiscal year 2017 operating results through a combination of base business growth, new project onstreams, and productivity benefits. We expect lower income from transition services agreements to be offset by cost reductions associated with these services. Our recent portfolio actions, including the spin-off of Versum and the sale PMD, and improved operating results have positioned us with a strong balance sheet and the opportunity to invest in our core industrial gases business to drive future growth and create shareholder value. The above guidance should be read in conjunction with the section entitled “Forward-Looking Statements.”

RESULTS OF OPERATIONS

Discussion of Consolidated Results

	2017	2016	2015
Sales	$8,187.6	$7,503.7	$7,824.3
Operating income	1,427.6	1,529.7	1,233.2
Operating margin	17.4 %	20.4 %	15.8 %
Equity affiliates’ income	80.1	147.0	152.3
Non-GAAP Measures			
Adjusted EBITDA	$2,795.0	$2,621.5	$2,399.4
Adjusted EBITDA margin	34.1 %	34.9 %	30.7 %
Adjusted operating income	1,769.6	1,619.9	1,388.6
Adjusted operating margin	21.6 %	21.6 %	17.7 %
Adjusted equity affiliates' income	159.6	147.0	152.3

Sales

	% Change from Prior Year	
	2017	2016
Underlying business		
Volume	6 %	3 %
Price	1 %	— %
Energy and raw material cost pass-through	3 %	(4)%
Currency	(1)%	(3)%
Total Consolidated Change	9 %	(4)%

2017 vs. 2016

Sales of $8,187.6 increased 9%, or $683.9. Underlying sales increased 7% from higher volumes of 6% and higher pricing of 1%. Higher volumes, primarily due to new project onstreams, underlying base business growth across the Industrial Gases regions, and continued progress on the Jazan project within our Industrial Gases – Global segment, were partially offset by lower LNG project activity in the Corporate and other segment. The pricing improvement was primarily attributable to the Industrial Gases – Asia segment. Higher energy and natural gas cost pass-through to customers increased sales by 3%, and unfavorable currency effects reduced sales by 1%.

2016 vs. 2015

Sales of $7,503.7 decreased 4.0%, or $320.6. Underlying sales increased 3%, primarily due to higher volumes in the Industrial Gases – Global and Industrial Gases – Asia segments, partially offset by lower volumes in all other segments. Price was flat as increases in the Industrial Gases – Americas and Industrial Gases – EMEA segments were offset by lower prices in the Industrial Gases – Asia segment. Underlying sales growth was more than offset by lower energy contractual cost pass-through to customers of 4% and unfavorable currency of 3%.

Table of Contents

Operating Income and Margin

2017 vs. 2016

Operating income of $1,427.6 decreased 7%, or $102.1, as a goodwill and intangible asset impairment charge of $162, higher cost reduction and asset actions of $117, unfavorable currency impacts of $9, and higher pension settlement losses of $5 were partially offset by favorable volumes of $83, favorable net operating costs of $69, lower business separation costs of $20, a gain on the sale of land of $12, and favorable pricing, net of energy, fuel, and raw material costs, of $7. Net operating costs were lower primarily due to benefits from cost reduction actions and higher other income. Operating margin of 17.4% decreased 300 bp, primarily due to the goodwill and intangible asset impairment charge and higher cost reduction and asset actions.

On a non-GAAP basis, adjusted operating income of $1,769.6 increased 9%, or $149.7, primarily due to higher volumes and favorable cost performance. Adjusted operating margin of 21.6% was flat as higher energy and natural gas pass-through to customers was offset by lower costs.

2016 vs. 2015

Operating income of $1,529.7 increased 24%, or $296.5, as lower operating costs of $235, lower business restructuring and cost reduction actions of $146, favorable pricing, net of energy, fuel, and raw material costs, of $33, and lower pension settlement losses of $14 were partially offset by higher business separation costs of $43, unfavorable currency impacts of $35, and lower volumes of $2. In addition, fiscal year 2015 included a gain on land sales of $34 and a gain of $18 on a previously held equity interest. Operating costs decreased due to benefits from our cost reduction actions of $115, lower pension expense of $33, lower maintenance expense of $37, and lower other costs of $50.

Operating margin of 20.4% increased 460 bp, primarily due to favorable costs and favorable pricing, net of energy, fuel, and raw material costs.

On a non-GAAP basis, adjusted operating income of $1,619.9 increased 17%, or $231.3, and adjusted operating margin of 21.6% increased 390 bp.

Adjusted EBITDA

We define Adjusted EBITDA as income from continuing operations (including noncontrolling interests) excluding certain disclosed items, which the Company does not believe to be indicative of underlying business trends, before interest expense, other non operating income (expense), net, income tax provision, and depreciation and amortization expense. Adjusted EBITDA provides a useful metric for management to assess operating performance.

2017 vs. 2016

Adjusted EBITDA of $2,795.0 increased $173.5, or 7%, primarily due to higher volumes and favorable cost performance. Adjusted EBITDA margin of 34.1% decreased 80 bp, primarily due to a 90 bp impact from higher energy pass-through to customers.

2016 vs. 2015

Adjusted EBITDA of $2,621.5 increased $222.1, or 9%, primarily due to favorable costs and favorable pricing, net of energy, fuel, and raw material costs. Adjusted EBITDA margin of 34.9% increased 420 bp.

Equity Affiliates’ Income

2017 vs. 2016

Income from equity affiliates of $80.1 decreased $66.9, primarily due to a noncash impairment charge of $79.5 ($.36 per share) on our investment in Abdullah Hashim Industrial Gases & Equipment Co., Ltd. (AHG), a 25% owned equity affiliate in our Industrial Gases – EMEA segment. This charge has been excluded from segment results. On a non-GAAP basis, adjusted equity affiliates' income of $159.6 increased 9%, or $12.6.

Refer to Note 8, Summarized Financial Information of Equity Affiliates, to the consolidated financial statements for additional information regarding the impairment charge.

2016 vs. 2015

Income from equity affiliates of $147.0 decreased $5.3, as lower income from Industrial Gases – Americas and Industrial Gases – EMEA affiliates was partially offset by higher income from Industrial Gases – Asia affiliates.

Table of Contents

Cost of Sales and Gross Margin

2017 vs. 2016

Cost of sales of $5,753.4 increased $576.8, or 11%, due to higher costs attributable to sales volumes of $418, higher energy and natural gas cost pass-through to customers of $218, and higher other costs of $24, partially offset by favorable currency impacts of $83.

Gross margin of 29.7% decreased 130 bp, primarily due to higher energy and natural gas cost pass-through to customers and unfavorable volume mix.

2016 vs. 2015

Cost of sales of $5,176.6 decreased $421.6, or 8%, primarily due to lower energy costs of $271, a favorable currency impact of $192, and lower operating costs of $148, partially offset by higher costs attributable to sales volumes of $189. Operating costs included favorable impacts from cost reduction actions of $48, lower maintenance costs of $37, lower pension expense of $21, as well as the benefits of other operational improvements and productivity. Costs associated with volumes were higher primarily due to the Jazan sale of equipment activity.

Gross margin of 31.0% increased 250 bp, primarily due to lower costs.

Selling and Administrative Expense

2017 vs. 2016

Selling and administrative expense of $715.6 increased $30.6, or 4%, primarily due to costs in support of transition services agreements with Versum and Evonik, for which the reimbursement is reflected in "Other income (expense), net." Selling and administrative expense as a percent of sales decreased to 8.7% from 9.1%.

2016 vs. 2015

Selling and administrative expense of $685.0 decreased $88.0, or 11%, primarily due to the benefits of cost reduction actions of $59 and favorable currency effects of $27. Selling and administrative expense as a percent of sales decreased to 9.1% from 9.9%.

Research and Development

2017 vs. 2016

Research and development expense of $57.8 decreased $13.8, or 19%. Research and development expense as a percent of sales decreased to .7% from 1.0%.

2016 vs. 2015

Research and development expense of $71.6 decreased $4.8, or 6%. Fiscal year 2016 and 2015 research and development expense as a percent of sales was 1.0%.

Business Separation Costs

In connection with the disposition of EMD and PMD, we incurred separation costs of $30.2 ($26.5 after-tax, or $.12 per share), $50.6 ($46.7 after-tax, or $.21 per share), and $7.5 ($.03 per share) in fiscal year 2017, 2016, and 2015, respectively. These costs are reflected on the consolidated income statements as “Business separation costs” and include legal, advisory, and pension related costs.

Our fiscal year 2017 income tax provision includes net tax benefits of $5.5 ($.02 per share) primarily related to changes in tax positions on business separation activities. Our fiscal year 2016 income tax provision includes additional tax expense related to the separation of $51.8 ($.24 per share), of which $45.7 resulted from a dividend that was declared in June 2016 to repatriate $443.8 from a subsidiary in South Korea to the U.S. in anticipation of the separation of EMD from the industrial gases business in South Korea.

Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information regarding the dispositions.

Table of Contents

Business Restructuring and Cost Reduction Actions

We recorded charges in fiscal year 2017, 2016, and 2015 for business restructuring and cost reduction actions. The charges for these actions are excluded from segment operating income. Refer to Note 5, Business Restructuring and Cost Reduction Actions, to the consolidated financial statements for additional details on these actions.

Cost Reduction Actions

In fiscal year 2017, we recognized a net expense of $151.4 ($109.3 attributable to Air Products, after-tax, or $.49 per share), of which $154.8 related to actions taken during the current year, partially offset by the favorable settlement of the remaining $3.4 accrued balance associated with prior business restructuring actions. Asset actions totaled $88.5 and included charges resulting from the write down of an air separation unit in the Industrial Gases – EMEA segment that was constructed mainly to provide oxygen to one of the Energy from Waste plants, the planned sale of a non-industrial gas hardgoods business in the Industrial Gases – Americas segment, and the closure of a facility in the Corporate and other segment that manufactured LNG heat exchangers. Severance and other benefits totaled $66.3 and related to the elimination or planned elimination of approximately 625 positions, primarily in the Corporate and other segment and in the Industrial Gases – EMEA segment. The actions in the Corporate and other segment were driven by the reorganization of our engineering, manufacturing, and technology functions.

In fiscal year 2016, we recognized an expense of $34.5 ($24.7 after-tax, or $.11 per share) for severance and other benefits related to cost reduction actions which resulted in the elimination of approximately 610 positions. The expenses related primarily to the Industrial Gases – Americas segment and the Industrial Gases – EMEA segment.

Business Realignment and Reorganization

In fiscal year 2015, we recognized an expense of $180.1 ($132.9 after-tax, or $.61 per share). Severance and other benefits totaled $131.5 and related to the elimination of approximately 1,700 positions. Asset and associated contract actions totaled $48.6 and related primarily to a plant shutdown in the Corporate and other segment and the exit of a product line within the Industrial Gases – Global segment.

Pension Settlement Loss

Certain of our pension plans provide for a lump sum benefit payment option at the time of retirement, or for corporate officers, six months after their retirement date. A participant's vested benefit is considered settled upon cash payment of the lump sum. We recognize pension settlement losses when cash payments exceed the sum of the service and interest cost components of net periodic benefit cost of the plan for the fiscal year. We recognized pension settlement losses of $10.5 ($6.6 after-tax, or $.03 per share), $5.1 ($3.3 after-tax, or $.02 per share), and $19.3 ($12.4 after-tax, or $.06 per share) in fiscal year 2017, 2016, and 2015, respectively, to accelerate recognition of a portion of actuarial losses deferred in accumulated other comprehensive loss, primarily associated with the U.S. Supplementary Pension Plan.

Goodwill and Intangible Asset Impairment Charge

During the third quarter of fiscal year 2017, we determined that the goodwill and indefinite-lived intangible assets (primarily acquired trade names) associated with our Latin America reporting unit of our Industrial Gases – Americas segment were impaired. We recorded a noncash impairment charge of $162.1 ($154.1 attributable to Air Products, after-tax, or $.70 per share), which was driven by lower economic growth and profitability in the region. Refer to Note 10, Goodwill, and Note 11, Intangible Assets, to the consolidated financial statements for additional details.

Table of Contents

Gain on Previously Held Equity Interest

On 30 December 2014, we acquired our partner's equity ownership interest in a liquefied atmospheric industrial gases production joint venture in North America for $22.6, which increased our ownership from 50% to 100%. The transaction was accounted for as a business combination, and subsequent to the acquisition, the results were consolidated within our Industrial Gases – Americas segment. We recorded a gain of $17.9 ($11.2 after-tax, or $.05 per share) as a result of revaluing our previously held equity interest to fair value as of the acquisition date. Refer to Note 6, Business Combination, to the consolidated financial statements for additional details.

Other Income (Expense), Net

Items recorded to other income (expense), net arise from transactions and events not directly related to our principal income earning activities. The detail of other income (expense), net is presented in Note 23, Supplemental Information, to the consolidated financial statements.

2017 vs. 2016

Other income (expense), net of $121.0 increased $71.6, primarily due to income from transition services agreements with Versum and Evonik, income from the sale of assets and investments, including a gain of $12.2 ($7.6 after-tax, or $.03 per share) resulting from the sale of a parcel of land, and a favorable foreign exchange impact.

2016 vs. 2015

Other income (expense), net of $49.4 increased $3.9, primarily due to lower foreign exchange losses, favorable contract settlements, and receipt of a government subsidy. Fiscal year 2015 included a gain of $33.6 ($28.3 after tax, or $.13 per share) resulting from the sale of two parcels of land. No other individual items were significant in comparison to fiscal year 2015.

Interest Expense

	2017	2016	2015
Interest incurred	$139.6	$147.9	$151.9
Less: Capitalized interest	19.0	32.7	49.1
Interest Expense	$120.6	$115.2	$102.8

2017 vs. 2016

Interest incurred decreased $8.3 as the impact from a lower average debt balance of $26 was partially offset by the impact from a higher average interest rate on the debt portfolio of $19. The change in capitalized interest was driven by a decrease in the carrying value of projects under construction, primarily as a result of our decision to exit from the Energy-from-Waste business.

2016 vs. 2015

Interest incurred decreased $4.0. The decrease primarily resulted from a stronger U.S. dollar on the translation of foreign currency interest of $6, partially offset by a higher average debt balance of $2. The change in capitalized interest was driven by a decrease in the carrying value of projects under construction, primarily as a result of our exit from the Energy-from-Waste business.

Other Non-Operating Income (Expense), Net

Other non-operating income (expense), net of $29.0 in fiscal year 2017 primarily resulted from interest income on cash and time deposits, which are comprised primarily of proceeds from the sale of PMD. Interest income was included in "Other income (expense), net" in 2016 and 2015. Interest income in previous periods was not material.

Loss on Extinguishment of Debt

On 30 September 2016, in anticipation of the spin-off of EMD, Versum issued $425.0 of notes to Air Products, who then exchanged these notes with certain financial institutions for $418.3 of Air Products' outstanding commercial paper. This noncash exchange, which was excluded from the consolidated statements of cash flows, resulted in a loss of $6.9 ($4.3 after-tax, or $.02 per share).

In September 2015, we made a payment of $146.6 to redeem 3,000,000 Unidades de Fomento ("UF") Series E 6.30% Bonds due 22 January 2030 that had a carrying value of $130.0 and resulted in a net loss of $16.6 ($14.2 after-tax, or $.07 per share).

Table of Contents

Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes. Refer to Note 22, Income Taxes, to the consolidated financial statements for details on factors affecting the effective tax rate.

2017 vs. 2016

The effective tax rate was 18.4% and 27.8% in 2017 and 2016, respectively. The current year rate included an impact of approximately 700 bp from a net income tax benefit resulting from a tax election related to a non-U.S. subsidiary and an impact of approximately 100 bp from excess tax benefits on share-based compensation resulting from the adoption of new accounting guidance in the first quarter of fiscal year 2017. These impacts were partially offset by an increase of approximately 200 bp due to both a goodwill impairment charge in our Latin America reporting unit and an impairment of an equity method investment for which no tax benefits were available. The 2016 rate included a 330 bp impact from tax costs associated with business separation, primarily resulting from a dividend declared in 2016 to repatriate cash from a foreign subsidiary as discussed above under Business Separation Costs. The remaining change was primarily due to the impact of business separation costs for which a tax benefit was estimated to not be available. On a non-GAAP basis, the adjusted effective tax rate decreased from 24.2% in 2016 to 23.2% in 2017, primarily due to excess tax benefits on share-based compensation. Refer to Note 2, New Accounting Guidance, to the consolidated financial statements for additional information on our adoption of the share-based compensation accounting guidance.

2016 vs. 2015

The effective tax rate was 27.8% and 23.7% in 2016 and 2015, respectively. The change included a 330 bp impact from tax costs associated with business separation, primarily resulting from a dividend declared in 2016 to repatriate cash from a foreign subsidiary as discussed above under Business Separation Costs. The remaining 80 bp change was primarily due to the increase in mix of income in jurisdictions with a higher effective tax rate and the impact of business separation costs for which a tax benefit was estimated to not be available. On a non-GAAP basis, the adjusted effective tax rate increased from 24.0% in 2015 to 24.2% in 2016, primarily due to the increase in and mix of income in jurisdictions with a higher effective tax rate.

Discontinued Operations

The results of our former Materials Technologies segment and the former Energy-from-Waste segment have been presented as discontinued operations. Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information, including detail of the major line items that comprise income from discontinued operations, net of tax, on the consolidated income statements for the fiscal years ended 30 September 2017, 2016, and 2015.

Materials Technologies

On 16 September 2015, we announced plans to separate our Materials Technologies segment, which contained EMD and PMD. On 1 October 2016, we completed the separation of EMD through the spin-off of Versum. On 3 January 2017, we completed the sale of PMD to Evonik for $3.8 billion in cash. A gain of $2,870 ($1,828 after-tax, or $8.32 per share) was recognized on the sale. As a result of the dispositions, both EMD and PMD are reflected in our consolidated financial statements as discontinued operations for all periods presented.

Energy-from-Waste

On 29 March 2016, the Board of Directors approved the Company's exit of its Energy from Waste (EfW) business and efforts to start up and operate the two EfW projects located in Tees Valley, United Kingdom, were discontinued. Since that time, the EfW segment has been presented as a discontinued operation. Our fiscal year 2016 loss from discontinued operations, net of tax, includes a loss on disposal of $945.7 ($846.6 after-tax) recorded to write down plant assets to their estimated net realizable value and record a liability for plant disposition and other costs.

During the first quarter of fiscal year 2017, we determined that it is unlikely for a buyer to assume the remaining assets and contract obligations, including land lease obligations. As a result, we recorded an additional loss of $59.3 ($47.1 after-tax) in results of discontinued operations, of which $53.0 was recorded primarily for land lease obligations and $6.3 was recorded to update our estimate of the net realizable value of the plant assets as of 31 December 2016. There have been no changes to our estimates during the remainder of fiscal year 2017. We may incur additional exit costs in future periods related to other outstanding commitments.

27

Table of Contents

Segment Analysis

Industrial Gases – Americas

	2017	2016	2015
Sales	$3,637.0	$3,344.1	$3,694.5
Operating income	950.6	893.2	806.1
Operating margin	26.1 %	26.7 %	21.8 %
Equity affiliates' income	58.1	52.7	64.6
Adjusted EBITDA	1,473.1	1,389.5	1,288.2
Adjusted EBITDA margin	40.5 %	41.6 %	34.9 %

Industrial Gases – Americas Sales

	% Change from Prior Year	
	2017	2016
Underlying business		
Volume	2 %	(2)%
Price	— %	1 %
Energy and raw material cost pass-through	6 %	(6)%
Currency	1 %	(2)%
Total Industrial Gases – Americas Change	9 %	(9)%

2017 vs. 2016

Underlying sales were up 2% from stronger hydrogen volumes and a new hydrogen plant in Canada. Higher energy and natural gas cost pass-through to customers increased sales by 6%. Favorable currency effects, primarily from the Chilean Peso, increased sales by 1%.

Operating income of $950.6 increased 6%, or $57.4, primarily due to lower operating costs of $37 and higher volumes of $18. Operating costs were lower due to benefits from productivity improvements. Operating margin decreased 60 bp from the prior year primarily due to higher energy and natural gas pass-through to customers, partially offset by favorable cost performance.

Equity affiliates' income of $58.1 increased $5.4, primarily due to lower maintenance expense and a new plant onstream.

2016 vs. 2015

Underlying sales decreased 1% from lower volumes of 2%, partially offset by higher pricing of 1%. Volumes were down due to weakness in Latin America and lower steel demand in North America. Pricing was higher due to the benefit of pricing actions, mainly the recovery of inflationary and power cost increases in Latin America. Lower energy contractual cost pass-through to customers, primarily natural gas, decreased sales by 6%. Currency decreased sales by 2% primarily due to the impacts of the Chilean Peso, Brazilian Real, and Canadian Dollar.

Operating income of $893.2 increased 11%, or $87.1, due to lower operating costs of $108 and higher pricing, net of energy and fuel costs, of $26, partially offset by lower volumes of $33 and unfavorable currency impacts of $14. Operating costs were lower due to benefits from cost reduction actions. Operating margin increased 490 bp from fiscal year 2015, primarily due to the lower costs, with additional benefits from lower energy pass-through and higher pricing.

Equity affiliates' income of $52.7 decreased $11.9, primarily due to unfavorable currency impacts and higher maintenance expense.

Table of Contents

Industrial Gases – EMEA

	2017	2016	2015
Sales	$1,780.4	$1,704.4	$1,866.4
Operating income	387.1	384.6	331.3
Operating margin	21.7 %	22.6 %	17.8 %
Equity affiliates' income	47.1	36.5	42.4
Adjusted EBITDA	611.3	606.8	568.0
Adjusted EBITDA margin	34.3 %	35.6 %	30.4 %

Industrial Gases – EMEA Sales

	% Change from Prior Year	
	2017	2016
Underlying business		
Volume	6 %	(2)%
Price	— %	1 %
Energy and raw material cost pass-through	1 %	(4)%
Currency	(3)%	(4)%
Total Industrial Gases – EMEA Change	4 %	(9)%

2017 vs. 2016

Underlying sales were up 6% from higher volumes as pricing was flat. Volumes increased primarily due to a new plant onstream in India. Higher energy and natural gas cost pass-through to customers increased sales by 1%. Unfavorable currency effects, primarily from the British Pound Sterling, reduced sales by 3%.

Operating income of $387.1 increased 1%, or $2.5, primarily due to lower operating costs of $21 and higher volumes, including a new plant onstream, of $15, partially offset by lower price net of power costs of $18 and unfavorable currency impacts of $15. Operating costs were lower primarily due to benefits from operational improvements. Operating margin decreased 90 bp from the prior year, as lower price net of power costs, higher energy and natural gas pass-through to customers, and unfavorable currency impacts were partially offset by favorable cost performance.

Equity affiliates' income of $47.1 increased $10.6, primarily due to higher volumes.

2016 vs. 2015

Underlying sales decreased 1% as lower volumes of 2% were partially offset by higher pricing of 1%. Volumes decreased primarily due to continued weakness in the European economy. Lower energy and natural gas contractual cost pass-through to customers decreased sales by 4%. Unfavorable currency effects from the Euro and the British Pound Sterling reduced sales by 4%. Other than the impact on currency, the Brexit vote in June of 2016 did not have a notable impact on our business.

Operating income of $384.6 increased 16%, or $53.3, primarily due to favorable operating costs of $60 and higher pricing, net of energy and fuel costs, of $20, partially offset by unfavorable currency impacts of $18 and lower volumes of $9. Operating margin increased 480 bp from fiscal year 2015 primarily due to favorable cost performance, higher pricing, and lower energy pass-through.

Equity affiliates' income of $36.5 decreased $5.9, primarily due to unfavorable currency impacts.

Industrial Gases – Asia

	2017	2016	2015
Sales	$1,964.7	$1,720.4	$1,661.3
Operating income	531.2	451.0	389.3
Operating margin	27.0 %	26.2 %	23.4 %
Equity affiliates' income	53.5	57.8	46.1
Adjusted EBITDA	787.9	706.7	645.3
Adjusted EBITDA margin	40.1 %	41.1 %	38.8 %

Table of Contents

Industrial Gases – Asia Sales

	% Change from Prior Year	
	2017	2016
Underlying business		
Volume	14 %	10 %
Price	1 %	(1)%
Energy and raw material cost pass-through	— %	— %
Currency	(1)%	(5)%
Total Industrial Gases – Asia Change	14 %	4 %

2017 vs. 2016

Underlying sales were up 15% from higher volumes of 14% and higher pricing of 1%. Volumes increased primarily due to new plant onstreams, sale of equipment activity, and base business growth driven by higher merchant volumes across Asia. Pricing was up 1% primarily due to increases in China wholesale, spot, and underlying prices during the second half of the year across all merchant liquid product lines. Unfavorable currency effects reduced sales by 1%, primarily from the Chinese Renminbi, partially offset by strengthening of the South Korean Won and Taiwan Dollar.

Operating income of $531.2 increased 18%, or $80.2, due to higher volumes of $68 and higher price net of power costs of $24, partially offset by higher operating costs of $8 and an unfavorable currency impact of $4. Operating margin increased 80 bp versus the prior year, primarily due to higher price net of power costs and favorable volumes partially offset by unfavorable cost performance.

Equity affiliates' income of $53.5 decreased $4.3, primarily due to favorable contract and insurance settlements in the prior year.

2016 vs. 2015

Underlying sales increased by 9% from higher volumes of 10%, partially offset by lower pricing of 1%. Volumes were higher primarily from new plants in China and higher merchant volumes across Asia. Pricing was down due to continued pricing pressure on merchant products in China and helium oversupply into Asia. Unfavorable currency impacts, primarily from the Chinese Renminbi, Korean Won, and Taiwanese Dollar decreased sales by 5%.

Operating income of $451.0 increased 16%, or $61.7, primarily due to higher volumes of $66 and lower operating costs of $27, partially offset by an unfavorable currency impact of $19 and unfavorable pricing, net of energy and fuel costs, of $12. The lower operating costs were driven by our operational improvements. Operating margin increased 280 bp due to favorable cost performance and higher volumes.

Equity affiliates' income of $57.8 increased $11.7 primarily due to favorable contract and insurance settlements, higher volumes, and improved cost performance.

Industrial Gases – Global

The Industrial Gases – Global segment includes sales of cryogenic and gas processing equipment for air separation and centralized global costs associated with management of all the Industrial Gases segments.

	2017	2016	2015
Sales	$722.9	$498.8	$286.7
Operating income (loss)	71.3	(21.3)	(51.6)
Adjusted EBITDA	81.1	(13.4)	(35.9)

2017 vs. 2016

Sales of $722.9 increased $224.1, or 45%. The increase in sales was primarily driven by a sale of equipment contract for multiple air separation units that will serve Saudi Aramco's Jazan oil refinery and power plant in Saudi Arabia. In 2017, we recognized approximately $540 of sales related to the Jazan project.

Operating income of $71.3 increased $92.6 from an operating loss in the prior year, primarily from income on the Jazan project and productivity improvements.

Table of Contents

2016 vs. 2015
Sales of $498.8 increased $212.1, or 74%. The increase in sales was driven by the Jazan project which more than offset the decrease in small equipment and other air separation unit sales. In 2016, we recognized approximately $300 of sales related to the Jazan project.
Operating loss of $21.3 decreased 59%, or $30.3, primarily from income on the Jazan project and benefits from cost reduction actions, partially offset by lower other sale of equipment project activity and a gain associated with the cancellation of a sale of equipment contract that was recorded in fiscal year 2015.
Corporate and other
The Corporate and other segment includes two ongoing global businesses (our LNG equipment business and our liquid helium and liquid hydrogen transport and storage container businesses), and corporate support functions that benefit all the segments. Corporate and other also includes income and expense that is not directly associated with the business segments, including foreign exchange gains and losses and stranded costs. Stranded costs result from functional support previously provided to the two divisions comprising the former Materials Technologies segment. The majority of these costs are reimbursed to Air Products pursuant to short-term transition services agreements under which Air Products provides transition services to Versum for EMD and to Evonik for PMD. The reimbursement for costs in support of the transition services has been reflected on the consolidated income statements within "Other income (expense), net."

	2017	2016	2015
Sales	$82.6	$236.0	$315.4
Operating loss	(170.6)	(87.6)	(86.5)
Adjusted EBITDA	(158.4)	(68.1)	(66.2)

2017 vs. 2016
Sales of $82.6 decreased $153.4, primarily due to lower LNG project activity. We expect continued weakness in new LNG project orders due to continued oversupply of LNG in the market. Operating loss of $170.6 increased $83.0 due to lower LNG activity, partially offset by productivity improvements and income from transition service agreements with Versum and Evonik.
2016 vs. 2015
Sales of $236.0 decreased $79.4, or 25%, primarily due to lower LNG sale of equipment activity. Operating loss of $87.6 increased 1%, or $1.1, due to lower LNG activity, mostly offset by benefits from our recent cost reduction actions and lower foreign exchange losses.
RECONCILIATION OF NON-GAAP FINANCIAL MEASURES
(Millions of dollars unless otherwise indicated, except for per share data)
The Company has presented certain financial measures on a non-GAAP (“adjusted”) basis and has provided a reconciliation to the most directly comparable financial measure calculated in accordance with GAAP. These financial measures are not meant to be considered in isolation or as a substitute for the most directly comparable financial measure calculated in accordance with GAAP. The Company believes these non-GAAP measures provide investors, potential investors, securities analysts, and others with useful supplemental information to evaluate the performance of the business because such measures, when viewed together with our financial results computed in accordance with GAAP, provide a more complete understanding of the factors and trends affecting our historical financial performance and projected future results.
In many cases, our non-GAAP measures are determined by adjusting the most directly comparable GAAP financial measure to exclude certain disclosed items (“non-GAAP adjustments”) that we believe are not representative of the underlying business performance. For example, Air Products has executed its strategic plan to restructure the Company to focus on its core Industrial Gases business. This resulted in significant cost reduction and asset actions that we believe are important for investors to understand separately from the performance of the underlying business. The reader should be aware that we may incur similar expenses in the future. The tax impact of our non-GAAP adjustments reflects the expected current and deferred income tax expense impact of the transactions and is impacted primarily by the statutory tax rate of the various relevant jurisdictions and the taxability of the adjustments in those jurisdictions. Investors should also consider the limitations associated with these non-GAAP measures, including the

potential lack of comparability of these measures from one company to another.

Table of Contents

Presented below are reconciliations of the reported GAAP results to the non-GAAP measures:
CONSOLIDATED RESULTS

	Continuing Operations					
	Operating Income	Operating Margin(A)	Equity Affiliates' Income	Income Tax Provision(B)	Net Income	Diluted EPS
2017 GAAP	$1,427.6	17.4 %	$80.1	$260.9	$1,134.4	$5.16
2016 GAAP	1,529.7	20.4 %	147.0	432.6	1,099.5	5.04
Change GAAP	$(102.1)	(300)bp	$(66.9)	$(171.7)	$34.9	$.12
% Change GAAP	(7)%		(46)%	(40)%	3 %	2 %
2017 GAAP	$1,427.6	17.4 %	$80.1	$260.9	$1,134.4	$5.16
Business separation costs(C)	30.2	.4 %	—	3.7	26.5	.12
Tax benefit associated with business separation(C)	—	— %	—	5.5	(5.5)	(.02)
Business restructuring and cost reduction actions(D)	151.4	1.8 %	—	41.6	109.3	.49
Pension settlement loss	10.5	.1 %	—	3.9	6.6	.03
Goodwill and intangible asset impairment charge(E)	162.1	2.0 %	—	4.6	154.1	.70
Gain on land sale(F)	(12.2)	(.1)%	—	(4.6)	(7.6)	(.03)
Equity method investment impairment charge	—	— %	79.5	—	79.5	.36
Tax election benefit	—	— %	—	111.4	(111.4)	(.50)
2017 Non-GAAP Measure	$1,769.6	21.6 %	$159.6	$427.0	$1,385.9	$6.31
2016 GAAP	$1,529.7	20.4 %	$147.0	$432.6	$1,099.5	$5.04
Business separation costs(C)	50.6	.7 %	—	3.9	46.7	.21
Tax costs associated with business separation(C)	—	— %	—	(51.8)	51.8	.24
Business restructuring and cost reduction actions	34.5	.4 %	—	9.8	24.7	.11
Pension settlement loss	5.1	.1 %	—	1.8	3.3	.02
Loss on extinguishment of debt(G)	—	— %	—	2.6	4.3	.02
2016 Non-GAAP Measure	$1,619.9	21.6 %	$147.0	$398.9	$1,230.3	$5.64
Change Non-GAAP Measure	$149.7	—	$12.6	$28.1	$155.6	$.67
% Change Non-GAAP Measure	9 %		9 %	7 %	13 %	12 %

Table of Contents

	Continuing Operations					
	Operating Income	Operating Margin[A]	Equity Affiliates' Income	Income Tax Provision[B]	Net Income	Diluted EPS
2016 GAAP	$1,529.7	20.4 %	$147.0	$ 432.6	$1,099.5	$5.04
2015 GAAP	1,233.2	15.8 %	152.3	300.2	933.3	4.29
Change GAAP	$296.5	460 bp	$(5.3)	$ 132.4	$166.2	$.75
% Change GAAP	24 %		(3)%	44 %	18 %	17 %
2016 GAAP	$1,529.7	20.4 %	$147.0	$ 432.6	$1,099.5	$5.04
Business separation costs[C]	50.6	.7 %	—	3.9	46.7	.21
Tax costs associated with business separation[C]	—	— %	—	(51.8)	51.8	.24
Business restructuring and cost reduction actions	34.5	.4 %	—	9.8	24.7	.11
Pension settlement loss	5.1	.1 %	—	1.8	3.3	.02
Loss on extinguishment of debt[G]	—	— %	—	2.6	4.3	.02
2016 Non-GAAP Measure	$1,619.9	21.6 %	$147.0	$ 398.9	$1,230.3	$5.64
2015 GAAP	$1,233.2	15.8 %	$152.3	$ 300.2	$933.3	$4.29
Business separation costs[C]	7.5	.1 %	—	—	7.5	.03
Business restructuring and cost reduction actions	180.1	2.3 %	—	47.2	132.9	.61
Pension settlement loss	19.3	.2 %	—	6.9	12.4	.06
Gain on previously held equity interest	(17.9)	(.3)%	—	(6.7)	(11.2)	(.05)
Gain on land sales[F]	(33.6)	(.4)%	—	(5.3)	(28.3)	(.13)
Loss on extinguishment of debt[G]	—	— %	—	2.4	14.2	.07
2015 Non-GAAP Measure	$1,388.6	17.7 %	$152.3	$ 344.7	$1,060.8	$4.88
Change Non-GAAP Measure	$231.3	390 bp	$(5.3)	$ 54.2	$169.5	$.76
% Change Non-GAAP Measure	17 %		(3)%	16 %	16 %	16 %

(A) Operating margin is calculated by dividing operating income by sales.

(B) The tax impact of our non-GAAP adjustments reflects the expected current and deferred income tax expense impact of the transactions and is impacted primarily by the statutory tax rate of the various relevant jurisdictions and the taxability of the adjustments in those jurisdictions.

(C) Refer to Note 4, Materials Technologies Separation, to the consolidated financial statements for additional information.

(D) Noncontrolling interests impact of $.5 in fiscal year 2017.

(E) Noncontrolling interests impact of $3.4 in fiscal year 2017.

(F) Reflected on the consolidated income statements in “Other income (expense), net.”

(G) Income from continuing operations before taxes impact of $6.9 and $16.6 in 2016 and 2015, respectively.

Table of Contents

ADJUSTED EBITDA

We define Adjusted EBITDA as income from continuing operations (including noncontrolling interests) excluding certain disclosed items, which the Company does not believe to be indicative of underlying business trends, before interest expense, other non-operating income (expense), net, income tax provision, and depreciation and amortization expense. Adjusted EBITDA provides a useful metric for management to assess operating performance.

Below is a reconciliation of Income from Continuing Operations on a GAAP basis to Adjusted EBITDA:

	2017	2016	2015	2014	2013
Income from Continuing Operations[(A)]	$1,155.2	$1,122.0	$965.9	$691.0	$900.0
Add: Interest expense	120.6	115.2	102.8	124.0	138.8
Less: Other non-operating income (expense), net	29.0	—	—	—	—
Add: Income tax provision	260.9	432.6	300.2	258.1	275.1
Add: Depreciation and amortization	865.8	854.6	858.5	875.6	824.6
Add: Business separation costs	30.2	50.6	7.5	—	—
Add: Business restructuring and cost reduction actions	151.4	34.5	180.1	11.1	98.3
Add: Pension settlement loss	10.5	5.1	19.3	5.2	—
Add: Goodwill and intangible asset impairment charge	162.1	—	—	310.1	—
Less: Gain on previously held equity interest	—	—	17.9	—	—
Add: Advisory costs	—	—	—	—	10.1
Less: Gain on land sales[(B)]	12.2	—	33.6	—	—
Add: Equity method investment impairment charge	79.5	—	—	—	—
Add: Loss on extinguishment of debt	—	6.9	16.6	—	—
Adjusted EBITDA	$2,795.0	$2,621.5	$2,399.4	$2,275.1	$2,246.9
Change GAAP					
Income from continuing operations change	$33.2	$156.1	$274.9	$(209.0)	
Income from continuing operations % change	3%	16%	40%	(23)%	
Change Non-GAAP					
Adjusted EBITDA change	$173.5	$222.1	$124.3	$28.2	
Adjusted EBITDA % change	7%	9%	5%	1%	

(A) Includes net income attributable to noncontrolling interests.

(B) Reflected on the consolidated income statements in “Other income (expense), net.”

Table of Contents

Below is a summary of segment operating income:

	Industrial Gases–Americas	Industrial Gases–EMEA	Industrial Gases–Asia	Industrial Gases–Global	Corporate and other	Segment Total
GAAP Measure						
Twelve Months Ended 30 September 2017						
Operating income (loss)	$950.6	$387.1	$531.2	$71.3	$(170.6)	$1,769.6
Operating margin	26.1 %	21.7 %	27.0 %			21.6 %
Twelve Months Ended 30 September 2016						
Operating income (loss)	$893.2	$384.6	$451.0	$(21.3)	$(87.6)	$1,619.9
Operating margin	26.7 %	22.6 %	26.2 %			21.6 %
Twelve Months Ended 30 September 2015						
Operating income (loss)	$806.1	$331.3	$389.3	$(51.6)	$(86.5)	$1,388.6
Operating margin	21.8 %	17.8 %	23.4 %			17.7 %
2017 vs. 2016						
Operating income (loss) change	$57.4	$2.5	$80.2	$92.6	$(83.0)	$149.7
Operating income (loss) % change	6 %	1 %	18 %	435 %	(95)%	9 %
Operating margin change	(60) bp	(90) bp	80 bp			—
2016 vs. 2015						
Operating income (loss) change	$87.1	$53.3	$61.7	$30.3	$(1.1)	$231.3
Operating income (loss) % change	11 %	16 %	16 %	59 %	(1)%	17 %
Operating margin change	490 bp	480 bp	280 bp			390 bp

Table of Contents

Below is a reconciliation of segment operating income to adjusted EBITDA:

	Industrial Gases– Americas	Industrial Gases– EMEA	Industrial Gases– Asia	Industrial Gases– Global	Corporate and other	Segment Total
Non-GAAP Measure						
Twelve Months Ended 30 September 2017						
Operating income (loss)	$950.6	$387.1	$531.2	$71.3	$(170.6)	$1,769.6
Add: Depreciation and amortization	464.4	177.1	203.2	8.9	12.2	865.8
Add: Equity affiliates' income	58.1	47.1	53.5	.9	—	159.6
Adjusted EBITDA	$1,473.1	$611.3	$787.9	$81.1	$(158.4)	$2,795.0
Adjusted EBITDA margin[(A)]	40.5 %	34.3 %	40.1 %			34.1 %
Twelve Months Ended 30 September 2016						
Operating income (loss)	$893.2	$384.6	$451.0	$(21.3)	$(87.6)	$1,619.9
Add: Depreciation and amortization	443.6	185.7	197.9	7.9	19.5	854.6
Add: Equity affiliates' income	52.7	36.5	57.8	—	—	147.0
Adjusted EBITDA	$1,389.5	$606.8	$706.7	$(13.4)	$(68.1)	$2,621.5
Adjusted EBITDA margin[(A)]	41.6 %	35.6 %	41.1 %			34.9 %
Twelve Months Ended 30 September 2015						
Operating income (loss)	$806.1	$331.3	$389.3	$(51.6)	$(86.5)	$1,388.6
Add: Depreciation and amortization	417.5	194.3	209.9	16.5	20.3	858.5
Add: Equity affiliates' income (loss)	64.6	42.4	46.1	(.8)	—	152.3
Adjusted EBITDA	$1,288.2	$568.0	$645.3	$(35.9)	$(66.2)	$2,399.4
Adjusted EBITDA margin[(A)]	34.9 %	30.4 %	38.8 %			30.7 %
2017 vs. 2016						
Adjusted EBITDA change	$83.6	$4.5	$81.2	$94.5	$(90.3)	$173.5
Adjusted EBITDA % change	6 %	1 %	11 %	705 %	(133)%	7 %
Adjusted EBITDA margin change	(110) bp	(130) bp	(100) bp			(80) bp
2016 vs. 2015						
Adjusted EBITDA change	$101.3	$38.8	$61.4	$22.5	$(1.9)	$222.1
Adjusted EBITDA % change	8 %	7 %	10 %	63 %	(3)%	9 %
Adjusted EBITDA margin change	670 bp	520 bp	230 bp			420 bp

[(A)] Adjusted EBITDA margin is calculated by dividing Adjusted EBITDA by sales.

Table of Contents

INCOME TAXES

The tax impact of our non-GAAP adjustments reflects the expected current and deferred income tax expense impact of the transactions and is impacted primarily by the statutory tax rate of the various relevant jurisdictions and the taxability of the adjustments in those jurisdictions.

	Effective Tax Rate		
	2017	2016	2015
Income Tax Provision—GAAP	$260.9	$432.6	$300.2
Income from Continuing Operations before Taxes—GAAP	$1,416.1	$1,554.6	$1,266.1
Effective Tax Rate—GAAP	18.4 %	27.8 %	23.7 %
Income Tax Provision—GAAP	$260.9	$432.6	$300.2
Business separation costs	3.7	3.9	—
Tax benefit (costs) associated with business separation	5.5	(51.8)	—
Business restructuring and cost reduction actions	41.6	9.8	47.2
Pension settlement loss	3.9	1.8	6.9
Goodwill and intangible asset impairment charge	4.6	—	—
Gain on previously held equity interest	—	—	(6.7)
Gain on land sales	(4.6)	—	(5.3)
Equity method investment impairment charge	—	—	—
Loss on extinguishment of debt	—	2.6	2.4
Tax election benefit	111.4	—	—
Income Tax Provision—Non-GAAP Measure	$427.0	$398.9	$344.7
Income from Continuing Operations before Taxes—GAAP	$1,416.1	$1,554.6	$1,266.1
Business separation costs	30.2	50.6	7.5
Business restructuring and cost reduction actions	151.4	34.5	180.1
Pension settlement loss	10.5	5.1	19.3
Goodwill and intangible asset impairment charge	162.1	—	—
Gain on previously held equity interest	—	—	(17.9)
Gain on land sales	(12.2)	—	(33.6)
Equity method investment impairment charge	79.5	—	—
Loss on extinguishment of debt	—	6.9	16.6
Income from Continuing Operations Before Taxes—Non-GAAP Measure	$1,837.6	$1,651.7	$1,438.1
Effective Tax Rate—Non-GAAP Measure	23.2 %	24.2 %	24.0 %

LIQUIDITY AND CAPITAL RESOURCES

We maintained a strong financial position throughout 2017 and as of 30 September 2017 our consolidated balance sheet included cash and cash items of $3,273.6. The cash and cash items balance is higher than our historical trend and primarily results from the sale of PMD to Evonik on 3 January 2017. We continue to have consistent access to commercial paper markets, and cash flows from operating and financing activities are expected to meet liquidity needs for the foreseeable future.

As of 30 September 2017, we had $1,530.2 of foreign cash and cash items compared to a total amount of cash and cash items of $3,273.6. If the foreign cash and cash items are needed for operations in the U.S. or we otherwise elect to repatriate the funds, we may be required to accrue and pay U.S. taxes on a significant portion of these amounts. However, since we have significant current investment plans outside the U.S., it is our intent to permanently reinvest the majority of our foreign cash and cash items outside the U.S. Current financing alternatives do not require the repatriation of foreign funds.

Table of Contents

Our cash flows from operating, investing, and financing activities from continuing operations, as reflected in the consolidated statements of cash flows, are summarized in the following table:

Cash provided by (used for)	2017	2016	2015
Operating activities	$2,534.1	$2,258.8	$2,047.0
Investing activities	(1,417.7)	(864.8)	(1,146.7)
Financing activities	(2,040.9)	(860.2)	(960.4)

Operating Activities

For the year ended 2017, cash provided by operating activities was $2,534.1. Income from continuing operations of $1,134.4 included a goodwill and intangible impairment charge of $162.1, an equity method investment impairment charge of $79.5, and a write-down of long-lived assets associated with restructuring of $69.2. Refer to Note 5, Business Restructuring and Cost Reduction Actions; Note 8, Summarized Financial Information of Equity Affiliates; Note 10, Goodwill; and Note 11, Intangible Assets, of the consolidated financial statements for additional information on these charges. Other specifically identified adjustments to income from continuing operations include depreciation and amortization, deferred income taxes, share-based compensation, noncurrent capital lease receivables, and undistributed earnings of unconsolidated affiliates. Other adjustments of $165.4 included changes in uncertain tax positions and the fair value of foreign exchange contracts that hedge intercompany loans as well as pension contributions and expense. The working capital accounts were a source of cash of $48.0 that were primarily driven by payables and accrued liabilities and other receivables, partially offset by other working capital and trade receivables. The increase in payables and accrued liabilities of $163.8 was primarily due to timing differences related to payables and accrued liabilities and an increase in customer advances of $52.8 primarily related to sale of equipment activity. The source of cash from other receivables of $124.7 was primarily due to the maturities of forward exchange contracts that hedged foreign currency exposures. Other working capital was a use of cash of $154.0, primarily driven by payments for income taxes. Trade receivables was a use of cash of $73.6 which is primarily due to timing differences.

For the year ended 2016, cash provided by operating activities was $2,258.8. Income from continuing operations of $1,099.5 included a loss on extinguishment of debt of $6.9. Other adjustments of $156.7 were primarily driven by the remeasurement of intercompany transactions as the related hedging instruments that eliminate the earnings impact are included in other receivables and payables and accrued liabilities. The working capital accounts were a source of cash of $21.2 that were primarily driven by payables and accrued liabilities and inventory partially offset by trade receivables and other working capital. The increase in payables and accrued liabilities of $60.1 was primarily related to an increase in customer advances which includes payment from our joint venture in Jazan, Saudi Arabia and was partially offset by the changes in the fair value of foreign exchange contracts that hedge intercompany loans. The use of cash from other working capital of $47.8 was primarily driven by advances associated with the purchase of helium partially offset by an increase in accrued income taxes, including the impacts of higher income.

For the year ended 2015, cash provided by operating activities was $2,047.0. Income from continuing operations of $933.3 included the write-down of long-lived assets associated with business restructuring of $40.2, a noncash gain on the previously held equity interest of $17.9, and a loss on extinguishment of debt of $16.6. Other adjustments included pension and postretirement expense of $120.1 and contributions to our pension plans of $137.5, primarily for plans in the U.S. and U.K. Management considers various factors when making pension funding decisions, including tax, cash flow, and regulatory implications. The working capital accounts were a source of cash of $256.0. The increase of payables and accrued liabilities of $134.9 includes an increase in accrued incentive compensation of $72.7.

Investing Activities

For the year ended 30 September 2017, cash used for investing activities was $1,417.7. Capital expenditures for plant and equipment was $1,039.7. Purchases of investments of $2,692.6 include short-term instruments with original maturities greater than three months and less than one year. Proceeds from investments of $2,290.7 resulted from maturities of short-term instruments with original maturities greater than three months and less than one year.

For the year ended 30 September 2016, cash used for investing activities was $864.8, driven by capital expenditures for plant and equipment of $907.7. Proceeds from the sale of assets and investments of $44.6 was primarily driven by the receipt of $30.0 for our rights to a corporate aircraft that was under construction.

Table of Contents

For the year ended 30 September 2015, cash used for investing activities was $1,146.7, primarily capital expenditures for plant and equipment. On 30 December 2014, we acquired our partner's equity ownership interest in a liquefied atmospheric industrial gases production joint venture in North America which increased our ownership from 50% to 100%. Refer to Note 6, Business Combination, to the consolidated financial statements for additional information.

Capital Expenditures

Capital expenditures are detailed in the following table:

	2017	2016	2015
Additions to plant and equipment	$1,039.7	$907.7	$1,162.4
Acquisitions, less cash acquired	8.2	—	34.5
Investments in and advances to unconsolidated affiliates	8.1	—	4.3
Capital Expenditures on a GAAP Basis	$1,056.0	$907.7	$1,201.2
Capital lease expenditures[(A)]	9.9	27.2	95.6
Purchase of noncontrolling interests in a subsidiary[(A)]	—	—	278.4
Capital Expenditures on a Non-GAAP Basis	$1,065.9	$934.9	$1,575.2

(A) We utilize a non-GAAP measure in the computation of capital expenditures and include spending associated with facilities accounted for as capital leases and purchases of noncontrolling interests. Certain contracts associated with facilities that are built to provide product to a specific customer are required to be accounted for as leases, and such spending is reflected as a use of cash in the consolidated statements of cash flows within "Cash Provided by Operating Activities" if the arrangement qualifies as a capital lease. Additionally, the purchase of subsidiary shares from noncontrolling interests is accounted for as a financing activity in the statement of cash flows. The presentation of this non-GAAP measure is intended to enhance the usefulness of information by providing a measure that our management uses internally to evaluate and manage our expenditures.

Capital expenditures on a GAAP basis in 2017 totaled $1,056.0, compared to $907.7 in 2016. The increase of $148.3 was primarily due to higher capital expenditures on facility improvement projects and major project spending. Additions to plant and equipment also included support capital of a routine, ongoing nature, including expenditures for distribution equipment and facility improvements. Spending in 2017 and 2016 included plant and equipment constructed to provide oxygen and nitrogen for coal to liquid fuel in China, hydrogen to global markets, oxygen to the steel industry, and nitrogen for the electronics industry.

Capital expenditures on a non-GAAP basis in 2017 totaled $1,065.9 compared to $934.9 in 2016. The increase of $131.0 was primarily due to higher capital expenditures on facility improvement projects and major project spending partially offset by lower capital lease expenditures.

On 19 April 2015, a joint venture between Air Products and ACWA Holding entered into a 20-year oxygen and nitrogen supply agreement to supply Saudi Aramco's oil refinery and power plant being built in Jazan, Saudi Arabia. Air Products owns 25% of the joint venture. During 2016 and 2015, we recorded noncash transactions which resulted in an increase of $26.9 and $67.5, respectively, to our investment in net assets of and advances to equity affiliates for our obligation to invest in the joint venture. These noncash transactions were excluded from the consolidated statements of cash flows and there was no impact in 2017. In total, we expect to invest approximately $100 in this joint venture. Air Products has also entered into a sale of equipment contract with the joint venture to engineer, procure, and construct the industrial gas facilities that will supply the gases to Saudi Aramco.

Sales backlog represents our estimate of revenue to be recognized in the future on our share of Air Products' sale of equipment orders and related process technology that are under firm contracts. The sales backlog for the Company at 30 September 2017 was $481 compared to $1,057 at 30 September 2016. The decrease was primarily driven by progress on the Jazan project.

2018 Outlook

Capital expenditures for new plant and equipment in 2018 are expected to be approximately $1,000 to $1,200. This range excludes possible acquisitions and our previously announced agreement to form a joint venture, Air Products Lu'an (Changzhi) Co., Ltd., with Lu'An Clean Energy Company that will build, own and operate four large air separation units as discussed in the Contractual Obligations section on page 43. A majority of the total capital expenditures is expected to be for new plants that are currently under construction or expected to start construction. It is anticipated that capital expenditures will be funded principally with our current cash balance and cash generated from continuing operations. In addition, we intend to continue to evaluate acquisitions of small and medium size industrial gas companies or assets from other industrial gas companies; the purchase of existing industrial gas facilities from our customers to create long-term contracts where we own and operate the plant and sell industrial gases to the customer based on a fixed fee; and investment in very large industrial gas projects driven by demand for more energy, cleaner energy, and emerging market growth.

Financing Activities

For the year ended 2017, cash used for financing activities was $2,040.9. This consisted primarily of repayments of commercial paper and short-term borrowings of $798.6, dividend payments to shareholders of $787.9 and payments on long-term debt of $483.9. Payments on long-term debt primarily consisted of the repayment of a 4.625% Eurobond of €300 million ($317.2) that matured on 15 March 2017 and $138.0 for the repayment of industrial revenue bonds.

For the year ended 2016, cash used for financing activities was $860.2. Our borrowings (short- and long-term proceeds, net of repayments) were a net use of cash of $237.7 and included the repayment of the 2.0% Senior Note of $350.0 million on 2 August 2016, and a $144.2 use of cash for net commercial paper and other short-term debt borrowings which were partially offset by debt proceeds from the issuance of a .375% Eurobond of €350 million ($386.9) on 1 June 2016. Versum distributed in-kind notes with an aggregate principal amount of $425.0 to Air Products. However, since Air Products exchanged these notes with certain financial institutions for $418.3 of Air Products' outstanding commercial paper, this noncash debt for debt exchange was excluded from the consolidated statements of cash flows. Refer to Note 4, Materials Technologies Separation, to the consolidated financial statements for additional details. We also used cash to pay dividends of $721.2 and received proceeds from stock option exercises of $141.3.

For the year ended 2015, cash used for financing activities was $960.4 primarily attributable to cash used to pay dividends of $677.5 and payments for subsidiary shares from noncontrolling interest of $278.4, which was partially offset by proceeds from stock option exercises of $121.3. Our borrowings were a net use of cash of $73.9 and included $285.2 of net commercial paper and other short-term debt issuances, debt proceeds from the issuance of a 1.0% Eurobond of €300 million ($335.3), repayment of a 3.875% Eurobond of €300 million ($335.9), repayment of Industrial Revenue Bonds totaling $147.2, and repayment of 3,000,000 Unidades de Fomento ("UF") Series E 6.30% Bonds totaling $146.6. Refer to Note 15, Debt, to the consolidated financial statements for additional details.

Discontinued Operations

For the year ended 2017, cash flows of discontinued operations primarily included impacts associated with the spin-off of EMD as Versum on 1 October 2016 and the sale of PMD to Evonik on 3 January 2017. Cash used for operating activities of $966.2 was primarily driven by taxes paid on the gain on the sale of PMD. Cash provided by investing activities of $3,750.6 primarily resulted from the proceeds on the sale of PMD. Cash provided by financing activities resulted from a $69.5 receipt of cash from Versum related to finalization of the spin-off. Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information.

For the year ended 2016, discontinued operations primarily includes the Energy-from-Waste business, which the Company decided to exit in the second quarter of 2016, and the Materials Technologies business which contained two divisions, EMD and PMD. Cash provided by discontinued operations was $753.6 primarily driven by income from operations of discontinued operations, which excludes the noncash impairment charge, of $386.1 and long-term debt proceeds from Versum's Term Loan B of $575.0, partially offset by capital expenditures for plant and equipment of $245.1. Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information.

For the year ended 2015, cash used by discontinued operations was $47.2. The use of cash was primarily driven by expenditures for plant and equipment of $452.4 which primarily related to the Energy-from-Waste facilities. This use

of cash was partially offset by income from discontinued operations of $344.6. Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information.

Table of Contents

Financing and Capital Structure

Capital needs in 2017 were satisfied primarily with cash from operations. At the end of 2017, total debt outstanding was $3,962.8 compared to $5,210.9 at the end of 2016, and cash and cash items were $3,273.6 compared to $1,293.2 at the end of 2016.

On 31 March 2017, we entered into a five-year $2,500.0 revolving credit agreement with a syndicate of banks (the "2017 Credit Agreement"), under which senior unsecured debt is available to both the Company and certain of its subsidiaries. The 2017 Credit Agreement provides a source of liquidity for the Company and supports its commercial paper program. The Company's only financial covenant is a maximum ratio of total debt to total capitalization (total debt plus total equity) no greater than 70%. Total debt at 30 September 2017 and 2016, expressed as a percentage of total capitalization (total debt plus total equity), was 28.0% and 41.9%, respectively. No borrowings were outstanding under the 2017 Credit Agreement as of 30 September 2017.

The 2017 Credit Agreement terminates and replaces our previous $2,690.0 revolving credit agreement (the "2013 Credit Agreement"), which was to mature 30 April 2018. No borrowings were outstanding under the previous agreement at the time of its termination, and no early termination penalties were incurred.

Commitments totaling $23.4 are maintained by our foreign subsidiaries, all of which was borrowed and outstanding at 30 September 2017.

As of 30 September 2017, we are in compliance with all of the financial and other covenants under our debt agreements.

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1,000 of our outstanding common stock. We did not purchase any of our outstanding shares during fiscal years 2017, 2016 or 2015. At 30 September 2017, $485.3 in share repurchase authorization remains.

2018 Outlook

Cash flows from operations and financing activities are expected to meet liquidity needs for the foreseeable future and our working capital balance was $3,387.7 at 30 September 2017. We expect that we will continue to be in compliance with all of our financial covenants.

On 16 October 2017, we repaid a 1.2% Senior Note of $400 that matured on 15 October 2017. As of 30 September 2017, this note was reflected in current portion of long-term debt on the consolidated balance sheets.

Dividends

Dividends are declared by the Board of Directors and are usually paid during the sixth week after the close of the fiscal quarter. During 2017, the Board of Directors increased the quarterly dividend from $.86 per share to $.95 per share.

CONTRACTUAL OBLIGATIONS

We are obligated to make future payments under various contracts, such as debt agreements, lease agreements, unconditional purchase obligations, and other long-term obligations. The following table summarizes our obligations on a continuing operations basis as of 30 September 2017:

	Total	2018	2019	2020	2021	2022	Thereafter
Long-term debt obligations							
Debt maturities	$3,837	$416	$409	$356	$433	$401	$ 1,822
Contractual interest	438	76	75	57	49	37	144
Capital leases	30	2	2	2	3	1	20
Operating leases	314	57	46	35	27	23	126
Pension obligations	698	52	47	47	46	48	458
Unconditional purchase obligations	6,533	822	234	275	309	285	4,608
Obligation for future contribution to an equity affiliate	100	—	—	100	—	—	—
Total Contractual Obligations	$11,950	$1,425	$813	$872	$867	$795	$ 7,178

Table of Contents

Long-Term Debt Obligations

The long-term debt obligations include the maturity payments of long-term debt, including current portion, and the related contractual interest obligations. Refer to Note 15, Debt, to the consolidated financial statements for additional information on long-term debt.

Contractual interest is the interest we are contracted to pay on the long-term debt obligations without taking into account the interest impact of interest rate swaps related to any of this debt, which at current interest rates would slightly decrease contractual interest. We had $655 of long-term debt subject to variable interest rates at 30 September 2017, excluding fixed-rate debt that has been swapped to variable-rate debt. The rate assumed for the variable interest component of the contractual interest obligation was the rate in effect at 30 September 2017. Variable interest rates are primarily determined by U.S. short-term tax-exempt interest rates and by interbank offer rates.

Leases

Refer to Note 12, Leases, to the consolidated financial statements for additional information on capital and operating leases.

Pension Obligations

The amounts in the table above represent the current estimated cash payments to be made by us that in total equal the recognized pension liabilities, less the net pension liability transferred to discontinued operations. Refer to Note 16, Retirement Benefits, to the consolidated financial statements. These payments are based upon the current valuation assumptions and regulatory environment.

The total accrued liability for pension benefits is impacted by interest rates, plan demographics, actual return on plan assets, continuation or modification of benefits, and other factors. Such factors can significantly impact the amount of the liability and related contributions.

Unconditional Purchase Obligations

Approximately $5,600 of our unconditional purchase obligations relate to helium purchases, which include crude feedstock supply to multiple helium refining plants in North America as well as refined helium purchases from sources around the world. As a rare byproduct of natural gas production in the energy sector, these helium sourcing agreements are medium- to long-term and contain take-or-pay provisions. The refined helium is distributed globally and sold as a merchant gas, primarily under medium-term requirements contracts. While contract terms in the energy sector are longer than those in merchant, helium is a rare gas used in applications with few or no substitutions because of its unique physical and chemical properties.

Approximately $280 of our long-term unconditional purchase obligations relate to feedstock supply for numerous HyCO (hydrogen, carbon monoxide, and syngas) facilities. The price of feedstock supply is principally related to the price of natural gas. However, long-term take-or-pay sales contracts to HyCO customers are generally matched to the term of the feedstock supply obligations and provide recovery of price increases in the feedstock supply. Due to the matching of most long-term feedstock supply obligations to customer sales contracts, we do not believe these purchase obligations would have a material effect on our financial condition or results of operations.

The unconditional purchase obligations also include other product supply and purchase commitments and electric power and natural gas supply purchase obligations, which are primarily pass-through contracts with our customers.

Purchase commitments to spend approximately $300 for additional plant and equipment are included in the unconditional purchase obligations in 2018. In addition, we have purchase commitments totaling approximately $180 in 2018 relating to our long-term sale of equipment project for Saudi Aramco’s Jazan oil refinery.

We also purchase materials, energy, capital equipment, supplies, and services as part of the ordinary course of business under arrangements that are not unconditional purchase obligations. The majority of such purchases are for raw materials and energy, which are obtained under requirements-type contracts at market prices.

Obligation for Future Contribution to an Equity Affiliate

On 19 April 2015, a joint venture between Air Products and ACWA Holding entered into a 20-year oxygen and nitrogen supply agreement to supply Saudi Aramco’s oil refinery and power plant being built in Jazan, Saudi Arabia. Air Products owns 25% of the joint venture and guarantees the repayment of its share of an equity bridge loan. In total, we expect to invest approximately $100 in this joint venture. As of 30 September 2017 and 2016, we recorded a noncurrent liability of $94.4 for our obligation to make future equity contributions in 2020 based on our proportionate

share of the advances received by the joint venture under the loan.

Table of Contents

Investment in Joint Venture

On 10 September 2017, Air Products signed an agreement to form a joint venture, Air Products Lu'an (Changzhi) Co., Ltd., with Lu'An Clean Energy Company. Air Products has already invested $300 million to build, own, and operate four large air separation units to supply the Changzhi City site. Under the agreement, Air Products will contribute the air separation units and invest an additional $500. Air Products will own 60% of the joint venture and will consolidate its financial results. Closing will occur upon the completion of initial operational start-up and government and regulatory approvals. Due to the uncertainty of those milestones, the additional investment has been excluded from the contractual obligations table above.

Income Tax Liabilities

Noncurrent deferred income tax liabilities as of 30 September 2017 were $778.4. Tax liabilities related to unrecognized tax benefits as of 30 September 2017 were $146.4. These tax liabilities were excluded from the Contractual Obligations table as it is impractical to determine a cash impact by year given that payments will vary according to changes in tax laws, tax rates, and our operating results. In addition, there are uncertainties in timing of the effective settlement of our uncertain tax positions with respective taxing authorities. Refer to Note 22, Income Taxes, to the consolidated financial statements for additional information.

PENSION BENEFITS

The Company and certain of its subsidiaries sponsor defined benefit pension plans and defined contribution plans that cover a substantial portion of its worldwide employees. The principal defined benefit pension plans are the U.S. salaried pension plan and the U.K. pension plan. These plans were closed to new participants in 2005 and were replaced with defined contribution plans. The shift to defined contribution plans is expected to continue to reduce volatility of both plan expense and contributions.

The fair market value of plan assets for our defined benefit pension plans as of the 30 September 2017 measurement date increased to $4,409.2 from $4,116.4 at the end of fiscal year 2016. The projected benefit obligation for these plans was $5,107.1 and $5,327.3 at the end of fiscal years 2017 and 2016, respectively. The net unfunded liability decreased by approximately $513 from $1,211 to $698, primarily due to higher discount rates, favorable asset experience and the effects of the Versum spin-off and the sale of PMD to Evonik. Refer to Note 16, Retirement Benefits, to the consolidated financial statements for comprehensive and detailed disclosures on our postretirement benefits.

Pension Expense

	2017	2016	2015
Pension expense – Continuing operations	$72.0	$55.8	$115.0
Special terminations, settlements, and curtailments (included above)	15.0	6.0	30.5
Weighted average discount rate[(A)]	3.0 %	4.1 %	4.0 %
Weighted average expected rate of return on plan assets	7.4 %	7.5 %	7.4 %
Weighted average expected rate of compensation increase	3.5 %	3.5 %	3.5 %

(A) Effective in 2016, the Company began to measure the service cost and interest cost components of pension expense by applying spot rates along the yield curve to the relevant projected cash flows, as we believe this provides a better measurement of these costs. The Company accounted for this as a change in accounting estimate and, accordingly, accounted for it prospectively. This change did not affect the measurement of the total benefit obligation.

2017 vs. 2016

Pension expense, excluding special items, increased from the prior year primarily due to a decrease in the discount rate offset by favorable asset experience. Special items of $15.0 included pension settlement losses of $10.5 related to the U.S. Supplementary Pension Plan, curtailment and special termination benefits of $4.5, $2.5 of which was reflected in "Business separation costs" and $2.0 reflected in "Business restructuring and cost reduction actions" on the consolidated income statements.

2016 vs. 2015

Pension expense, excluding special items, decreased from fiscal year 2015 due to the adoption of the spot rate approach, which reduced service cost and interest cost, and the impacts from expected return on assets and

demographic gains, partially offset by the impact of the adoption of new mortality tables for our major plans. Special items of $6.0 included pension settlement losses of $5.1, special termination benefits of $2.0, and curtailment gains of $1.1. These resulted primarily from our recent business restructuring and cost reduction actions.

Table of Contents

2018 Outlook

In 2018, pension expense, excluding special items, is expected to be relatively flat compared to 2017 with a range of approximately $50 to $55. This results from lower loss amortization primarily due to favorable asset experience, offset by the impact of lower discount rates and a lower expected return on assets. Pension settlement losses of $5 to $10 are expected, depending on the timing of retirements. In 2018, we expect pension expense to include approximately $128 for amortization of actuarial losses. In 2017, total company pension expense, which includes both continuing and discontinued operations, included amortization of actuarial losses of $143. Net actuarial losses of $352 were recognized in accumulated other comprehensive income in 2017. Actuarial gains/losses are amortized into pension expense over prospective periods to the extent they are not offset by future gains or losses. Future changes in the discount rate and actual returns on plan assets different from expected returns would impact the actuarial gains/losses and resulting amortization in years beyond 2018.

As noted in Note 2, New Accounting Guidance, to the consolidated financial statements, we expect to early adopt guidance on the presentation of net periodic pension and postretirement benefit cost in 2018. The amendments require that the service cost component of the net periodic benefit cost be presented in the same line items as other compensation costs arising from services rendered by employees during the period. The other components of net periodic benefit cost will be presented outside of operating income.

Pension Funding

Pension funding includes both contributions to funded plans and benefit payments for unfunded plans, which are primarily non-qualified plans. With respect to funded plans, our funding policy is that contributions, combined with appreciation and earnings, will be sufficient to pay benefits without creating unnecessary surpluses.

In addition, we make contributions to satisfy all legal funding requirements while managing our capacity to benefit from tax deductions attributable to plan contributions. With the assistance of third party actuaries, we analyze the liabilities and demographics of each plan, which help guide the level of contributions. During 2017 and 2016, our cash contributions to funded plans and benefit payments for unfunded plans were $64.1 and $79.3, respectively.

For 2018, cash contributions to defined benefit plans are estimated to be $50 to $70. The estimate is based on expected contributions to certain international plans and anticipated benefit payments for unfunded plans, which are dependent upon the timing of retirements and future cost reduction actions. Actual future contributions will depend on future funding legislation, discount rates, investment performance, plan design, and various other factors. Refer to the Contractual Obligations discussion on pages 41-43 for a projection of future contributions.

ENVIRONMENTAL MATTERS

We are subject to various environmental laws and regulations in the countries in which we have operations. Compliance with these laws and regulations results in higher capital expenditures and costs. In the normal course of business, we are involved in legal proceedings under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA: the federal Superfund law); Resource Conservation and Recovery Act (RCRA); and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Our accounting policy for environmental expenditures is discussed in Note 1, Major Accounting Policies, to the consolidated financial statements, and environmental loss contingencies are discussed in Note 17, Commitments and Contingencies, to the consolidated financial statements.

The amounts charged to income from continuing operations related to environmental matters totaled $11.4, $12.2, and $11.8 in 2017, 2016, and 2015, respectively. These amounts represent an estimate of expenses for compliance with environmental laws and activities undertaken to meet internal Company standards. Future costs are not expected to be materially different from these amounts. Refer to Note 17, Commitments and Contingencies, to the consolidated financial statements for additional information.

Although precise amounts are difficult to determine, we estimate that we spent $7 in 2017, $3 in 2016, and $2 in 2015 on capital projects to control pollution. Capital expenditures to control pollution in future years are estimated to be approximately $3 in both 2018 and 2019.

We accrue environmental investigatory and remediation costs for identified sites when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. The potential exposure for such costs is estimated

to range from $83 to a reasonably possible upper exposure of $97 as of 30 September 2017. The consolidated balance sheets at 30 September 2017 and 2016 included an accrual of $83.6 and $81.4, respectively. The accrual for the environmental obligations includes amounts for the Pace, Florida; Piedmont, South Carolina;

and Pasadena, Texas, locations which were a part of previously divested chemicals businesses. Refer to Note 17, Commitments and Contingencies, to the consolidated financial statements for further details on these facilities.
Actual costs to be incurred at identified sites in future periods may vary from the estimates, given inherent uncertainties in evaluating environmental exposures. Subject to the imprecision in estimating future environmental costs, we do not expect that any sum we may have to pay in connection with environmental matters in excess of the amounts recorded or disclosed above would have a material adverse impact on our financial position or results of operations in any one year.

Some of our operations are within jurisdictions that have or are developing regulatory regimes governing emissions of greenhouse gases ("GHG"), including carbon dioxide. These include existing coverage under the European Union Emission Trading Scheme, California and Ontario cap and trade schemes, Alberta's Specified Gas Emitters Regulation, China's Emission Trading Scheme pilots, South Korea's Emission Trading Scheme, and mandatory reporting and anticipated constraints on GHG emissions under an Ontario cap and trade scheme, nation-wide expansion of the China Emission Trading Scheme, and revisions to the Alberta regulation. In addition, the U.S. Environmental Protection Agency ("EPA") requires mandatory reporting of GHG emissions and is regulating GHG emissions for new construction and major modifications to existing facilities. Some jurisdictions have various mechanisms to target the power sector to achieve emission reductions, which often result in higher power costs.
Increased public concern may result in more international, U.S. federal, and/or regional requirements to reduce or mitigate the effects of GHG. Although uncertain, these developments could increase our costs related to consumption of electric power and hydrogen production. We believe it will be able to mitigate some of the increased costs through contractual terms, but the lack of definitive legislation or regulatory requirements prevents an accurate estimate of the long-term impact these measures will have on our operations. Any legislation that limits or taxes GHG emissions could negatively impact our growth, increase our operating costs, or reduce demand for certain of our products.
Regulation of GHG may also produce new opportunities for us. We continue to develop technologies to help our facilities and our customers lower energy consumption, improve efficiency, and lower emissions. We are also developing a portfolio of technologies that capture carbon dioxide from steam methane reforming, enable cleaner transportation fuels, and facilitate alternate fuel source development. In addition, the potential demand for clean coal could increase demand for oxygen, one of our main products, and our proprietary technology for delivering low-cost oxygen.

OFF-BALANCE SHEET ARRANGEMENTS

We have entered into certain guarantee agreements as discussed in Note 17, Commitments and Contingencies, to the consolidated financial statements. We are not a primary beneficiary in any material variable interest entity. Our off-balance sheet arrangements are not reasonably likely to have a material impact on financial condition, changes in financial condition, results of operations, or liquidity.

RELATED PARTY TRANSACTIONS

Our principal related parties are equity affiliates operating in the industrial gas business. In 2015, we entered into a long-term sale of equipment contract to engineer, procure, and construct industrial gas facilities with a 25% owned joint venture for Saudi Aramco's Jazan oil refinery and power plant in Saudi Arabia. The agreement included terms that are consistent with those that we believe would have been negotiated at an arm's length with an independent party.
Sales related to this contract are included in the results of our Industrial Gases – Global segment and were approximately $540 and $300 during fiscal year 2017 and 2016, respectively. Sales related to this contract were not material during fiscal year 2015.

INFLATION

We operate in many countries that experience volatility in inflation and foreign exchange rates. The ability to pass on inflationary cost increases is an uncertainty due to general economic conditions and competitive situations. It is estimated that the cost of replacing our plant and equipment today is greater than its historical cost. Accordingly, depreciation expense would be greater if the expense were stated on a current cost basis.

Table of Contents

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Note 1, Major Accounting Policies, to the consolidated financial statements describes our major accounting policies. Judgments and estimates of uncertainties are required in applying our accounting policies in many areas. However, application of the critical accounting policies discussed below requires management's significant judgments, often as the result of the need to make estimates of matters that are inherently uncertain. If actual results were to differ materially from the estimates made, the reported results could be materially affected. Our management has reviewed these critical accounting policies and estimates and related disclosures with our audit committee.

Depreciable Lives of Plant and Equipment

Net plant and equipment at 30 September 2017 totaled $8,440.2, and depreciation expense totaled $843.2 during 2017. Plant and equipment is recorded at cost and depreciated using the straight-line method, which deducts equal amounts of the cost of each asset from earnings every year over its estimated economic useful life.

Economic useful life is the duration of time an asset is expected to be productively employed by us, which may be less than its physical life. Assumptions on the following factors, among others, affect the determination of estimated economic useful life: wear and tear, obsolescence, technical standards, contract life, market demand, competitive position, raw material availability, and geographic location.

The estimated economic useful life of an asset is monitored to determine its appropriateness, especially in light of changed business circumstances. For example, changes in technology, changes in the estimated future demand for products, or excessive wear and tear may result in a shorter estimated useful life than originally anticipated. In these cases, we would depreciate the remaining net book value over the new estimated remaining life, thereby increasing depreciation expense per year on a prospective basis. Likewise, if the estimated useful life is increased, the adjustment to the useful life decreases depreciation expense per year on a prospective basis.

The regional Industrial Gases segments have numerous long-term customer supply contracts for which we construct an on-site plant adjacent to or near the customer's facility. These contracts typically have initial contract terms of 10 to 20 years. Depreciable lives of the production assets related to long-term contracts are matched to the contract lives. Extensions to the contract term of supply frequently occur prior to the expiration of the initial term. As contract terms are extended, the depreciable life of the remaining net book value of the production assets is adjusted to match the new contract term, as long as it does not exceed the remaining physical life of the asset.

Our regional Industrial Gases segments also have contracts for liquid or gaseous bulk supply and, for smaller customers, packaged gases. The depreciable lives of production facilities associated with these contracts are generally 15 years. These depreciable lives have been determined based on historical experience combined with judgment on future assumptions such as technological advances, potential obsolescence, competitors' actions, etc. Management monitors its assumptions and may potentially need to adjust depreciable life as circumstances change.

A change in the weighted average remaining depreciable life by one year for assets associated with our regional Industrial Gases segments would impact annual depreciation expense as summarized below:

	Decrease Life By 1 Year	Increase Life By 1 Year
Industrial Gases – Regional	$ 40	$ (35)

Impairment of Assets

Plant and Equipment

Plant and equipment held for use is grouped for impairment testing at the lowest level for which there is identifiable cash flows. Impairment testing of the asset group occurs whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. Such circumstances would include a significant decrease in the market value of a long-lived asset grouping, a significant adverse change in the manner in which the asset grouping is being used or in its physical condition, an accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of the long-lived asset, a history of operating or cash flow losses associated with the use of the asset grouping, or changes in the expected useful life of the long-lived assets.

Table of Contents

If such circumstances are determined to exist, an estimate of undiscounted future cash flows produced by that asset group is compared to the carrying value to determine whether impairment exists. If an asset group is determined to be impaired, the loss is measured based on the difference between the asset group's fair value and its carrying value. An estimate of the asset group's fair value is based on the discounted value of its estimated cash flows. Assets that meet the held for sale criteria are reported at the lower of carrying amount or fair value less cost to sell.
The assumptions underlying the undiscounted future cash flow projections require significant management judgment. Factors that management must estimate include industry and market conditions, sales volume and prices, costs to produce, inflation, etc. The assumptions underlying the cash flow projections represent management's best estimates at the time of the impairment review. Changes in key assumptions or actual conditions that differ from estimates could result in an impairment charge. We use reasonable and supportable assumptions when performing impairment reviews and cannot predict the occurrence of future events and circumstances that could result in impairment charges.
On 29 March 2016, the Board of Directors approved the Company's exit of its Energy-from-Waste business. Accordingly, we assessed the recoverability of capital costs for the two projects associated with this business and recorded an impairment charge to the results of discontinued operations of $913.5 to reduce the carrying values of plant assets to their estimated net realizable value. We estimated the net realizable value of the projects assuming an orderly liquidation of assets capable of being marketed on a secondary equipment market based on market quotes and our experience with selling similar equipment. An asset's orderly liquidation value is the amount that could be realized from a liquidation sale, given a reasonable period of time to find a buyer, selling the asset in the existing condition where it is located, and assuming the highest and best use of the asset by market participants. The valuation includes inputs that are unobservable and therefore considered Level 3 inputs in the fair value hierarchy. The loss was measured as the difference between the orderly liquidation value of the assets and the net book value of the assets.
During the first quarter of fiscal year 2017, we recorded an additional loss of $6.3 to update our estimate of the net realizable value of the plant assets as of 31 December 2016 of $11.0. In addition, a charge of $45.7 was recorded to continuing operations to write-down the air separation unit in the Industrials Gases–EMEA segment that was constructed mainly to provide oxygen to one of the Energy-from-Waste plants to its net realizable value of $1.4. There have been no changes to our estimates during the remainder of 2017. Refer to Note 3, Discontinued Operations, and Note 5, Business Restructuring and Cost Reduction Actions, for additional information.
In the third quarter of 2017, we performed interim impairment testing of our Latin America reporting unit (LASA) long-lived assets and indefinite-lived intangible assets, including goodwill, as of 30 June 2017. See the discussions below under Goodwill and Intangible Assets on 2017 Impairment Testing. We also tested the recoverability of LASA's long-lived assets, including finite-lived intangible assets subject to amortization, and concluded that they were recoverable from expected future undiscounted cash flows.
Goodwill
The acquisition method of accounting for business combinations requires us to make use of estimates and judgments to allocate the purchase price paid for acquisitions to the fair value of the net tangible and identifiable intangible assets. Goodwill represents the excess of the aggregate purchase price over the fair value of identifiable net assets of an acquired entity. Goodwill was $721.5 as of 30 September 2017. Disclosures related to goodwill are included in Note 10, Goodwill, to the consolidated financial statements.
We review goodwill for impairment annually in the fourth quarter of the fiscal year and whenever events or changes in circumstances indicate the need for more frequent testing. The tests are done at the reporting unit level, which is defined as being equal to or one level below the operating segment for which discrete financial information is available and whose operating results are reviewed by segment managers regularly. We have five business segments and eleven reporting units. Reporting units are primarily based on products and subregions within each business segment. The majority of our goodwill is assigned to reporting units within the three regional Industrial Gases segments.
As part of the goodwill impairment testing, we have the option to 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 value. If we choose not to complete a qualitative assessment for a given reporting unit, or if the initial assessment indicates that it is more likely than not that the carrying value of a reporting unit exceeds its estimated fair value, a quantitative test is required. We

chose to bypass the qualitative assessment and conduct quantitative testing, as further described below.

As described in Note 2, New Accounting Guidance, to the consolidated financial statements, we elected to early adopt the new accounting guidance which simplified the test for goodwill impairment by eliminating Step 2, which measured the impairment loss based on the fair value of goodwill. Under the new guidance, an impairment loss will be recognized for the amount by which the carrying amount of the reporting unit exceeds its fair value, not to exceed the total amount of goodwill allocated to that reporting unit.

To determine the fair value of a reporting unit, we initially use an income approach valuation model, representing the present value of estimated future cash flows. Our valuation model uses a discrete growth period and an estimated exit trading multiple. The income approach is an appropriate valuation method due to our capital-intensive nature, the long-term contractual nature of our business, and the relatively consistent cash flows generated by our reporting units. The principal assumptions utilized in our income approach valuation model include revenue growth rates, operating profit and/or EBITDA margins, discount rate, and exit multiple. Projected revenue growth rates and operating profit and/or EBITDA assumptions are consistent with those utilized in our operating plan and/or revised forecasts and long-term financial planning process. The discount rate assumption is calculated based on an estimated market-participant risk-adjusted weighted-average cost of capital, which includes factors such as the risk-free rate of return, cost of debt, and expected equity premiums. The exit multiple is determined from comparable industry transactions and where appropriate, reflects expected long-term growth rates.

If our initial review under the income approach indicates there may be impairment, we incorporate results under the market approach to further evaluate the existence of impairment. When the market approach is utilized, fair value is estimated based on market multiples of revenue and earnings derived from comparable publicly-traded industrial gases companies and/or regional manufacturing companies engaged in the same or similar lines of business as the reporting unit, adjusted to reflect differences in size and growth prospects. When both the income and market approach are utilized, we review relevant facts and circumstances and make a qualitative assessment to determine the proper weighting. Management judgment is required in the determination of each assumption utilized in the valuation model, and actual results could differ from the estimates.

2017 Impairment Testing

For the first nine months of fiscal year 2017, volumes declined in our Latin America reporting unit (LASA), and overall revenue growth did not meet expectations. Due to weak economic conditions in Latin America and expectations for continued volume weakness in the Latin American countries and markets in which we operate, we lowered our long-term growth projections for LASA by more than 200 basis points, which also unfavorably impacted our EBITDA margin. Management considered the revised projections for LASA to be indicators of potential impairment and, accordingly, performed interim impairment testing of our long-lived assets and indefinite-lived intangible assets, including goodwill, as of 30 June 2017 utilizing the revised projections. LASA represents approximately 6% of the Company’s total revenue with business units in Chile, Colombia, and other Latin America countries.

We estimated the fair value of LASA as of 30 June 2017 based on two valuation approaches, the income approach and the market approach, as described above. We reviewed relevant facts and circumstances in determining the weighting of the approaches. Under the income approach, we estimated the fair value of LASA based on management's estimates of revenue growth rates and EBITDA margins, taking into consideration business and market conditions for the Latin American countries and markets in which we operate. These estimates were consistent with our revised forecast and long-term financial planning processes, which included a reduction in sales growth by more than 200 basis points from that previously identified. We calculated the discount rate based on a market-participant, risk-adjusted weighted average cost of capital, which considers industry-specific rates of return on debt and equity capital for a target industry capital structure, adjusted for risks associated with business size and geography. Under the market approach, we estimated fair value based on market multiples of revenue and earnings derived from publicly-traded industrial gases companies and regional manufacturing companies, adjusted to reflect differences in size and growth prospects.

Based on the results of the valuations, we determined that the goodwill associated with LASA was impaired and recorded a noncash impairment charge of $145.3, the amount by which the carrying amount of the reporting unit exceeded its fair value, during the third quarter of 2017. This impairment is reflected on our consolidated income statements within “Goodwill and intangible asset impairment charge.” This charge was not deductible for tax purposes

and has been excluded from segment operating income.

During the fourth quarter of 2017, we conducted our annual goodwill impairment testing. We determined that the fair value of all our reporting units substantially exceeded their carrying value except LASA, for which the fair value equaled the carrying value.

Table of Contents

The excess of fair value over carrying value for our reporting units other than LASA ranged from approximately 80% to approximately 350%. Management judgment is required in the determination of each assumption utilized in the valuation model, and actual results could differ from the estimates. In order to evaluate the sensitivity of the fair value calculation on the goodwill impairment test, we applied a hypothetical 10% decrease to the fair value of these reporting units. In this scenario, the fair value of our reporting units continued to exceed their carrying value by a range of approximately 60% to 300%.

As of 30 September 2017, the carrying value of Latin America goodwill was $67.3, or less than 1% of consolidated total assets. Further events that could have a negative impact on the level of excess fair value over carrying value of the reporting unit include but are not limited to a decline in market share, pricing pressures, and further economic weakening in the markets we serve. Revenue growth and EBITDA margin assumptions are two primary drivers of the fair value of LASA. We determined that, with other assumptions held constant, a decrease in revenue growth rates of approximately 125 basis points or a decrease in EBITDA margin of approximately 225 basis points would result in an impairment of the remaining goodwill balance. The carrying value of LASA's other material assets at 30 September 2017 included: Plant and equipment, net of $345.3; customer relationships of $166.3; and trade names and trademarks of $46.9. The trade names and trademarks are classified as indefinite-lived intangible assets.

Future events that could have a negative impact on the level of excess fair value over carrying value of the reporting units include, but are not limited to: long-term economic weakness, decline in market share, pricing pressures, inability to successfully implement cost improvement measures, increases to our cost of capital, and changes to the structure of our business as a result of future reorganizations or divestitures of assets or businesses. Negative changes in one or more of these factors, among others, could result in impairment charges.

We will continue to evaluate goodwill on an annual basis as of the beginning of our fourth fiscal quarter and whenever there are indicators of potential impairment, such as significant adverse changes in business climate or operating results or changes in management’s business outlook or strategy.

Intangible Assets

Intangible assets with determinable lives at 30 September 2017 totaled $321.4 and consisted primarily of customer relationships, purchased patents and technology, and land use rights. These intangible assets are tested for impairment as part of the long-lived asset grouping impairment tests. Impairment testing of the asset group occurs whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. See the impairment discussion above under Plant and Equipment for a description of how impairment losses are determined.

Indefinite-lived intangible assets at 30 September 2017 totaled $46.9 and consisted of trade names and trademarks. Indefinite-lived intangibles are subject to impairment testing at least annually or more frequently if events or changes in circumstances indicate that potential impairment exists. The impairment test for indefinite-lived intangible assets involves calculating the fair value of the indefinite-lived intangible assets and comparing the fair value to their carrying value. If the fair value is less than the carrying value, the difference is recorded as an impairment loss. To determine fair value, we utilize the royalty savings method, a form of the income approach. This method values an intangible asset by estimating the royalties avoided through ownership of the asset.

2017 Impairment Testing

In the third quarter of 2017, we conducted an interim impairment test and determined that the carrying value of the LASA indefinite-lived intangible assets was impaired. We determined that the carrying value of trade names and trademarks was in excess of fair value, and as a result, we recorded a noncash impairment charge of $16.8 to reduce these indefinite-lived intangible assets to their fair value. This impairment is reflected on our consolidated income statements within “Goodwill and intangible asset impairment charge"

In the fourth quarter of 2017, we conducted our annual impairment test of indefinite-lived intangibles and found no indications of impairment.

Table of Contents

Equity Investments

Investments in and advances to equity affiliates totaled $1,286.9 at 30 September 2017. The majority of our investments are non-publicly traded ventures with other companies in the industrial gas business. Summarized financial information of equity affiliates is included in Note 8, Summarized Financial Information of Equity Affiliates, to the consolidated financial statements. Equity investments are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment may not be recoverable.

In the event that a decline in fair value of an investment occurs, and the decline in value is considered to be other than temporary, an impairment loss would be recognized. Management's estimate of fair value of an investment is based on the income approach and/or market approach. We utilize estimated discounted future cash flows expected to be generated by the investee under the income approach. For the market approach, we utilize market multiples of revenue and earnings derived from comparable publicly-traded industrial gases companies. Changes in key assumptions about the financial condition of an investee or actual conditions that differ from estimates could result in an impairment charge.

During the third quarter of fiscal year 2017, Abdullah Hashim Industrial Gases & Equipment Co., Ltd. (AHG), a 25% owned equity affiliate in our Industrial Gases – EMEA segment, completed a review of its business plan and outlook. As a result of the revised business plan, we determined there was an other-than-temporary impairment of our investment in AHG and, therefore, recorded a noncash impairment charge of $79.5 to reduce the carrying value of our investment. This charge is reflected on our consolidated income statements within "Equity affiliates' income" and was not deductible for tax purposes.

The decline in value results from expectations for lower future cash flows to be generated by AHG, primarily due to challenging economic conditions in Saudi Arabia, including the impacts of lower prices in the oil and gas industry, increased competition, and capital project growth opportunities not materializing as anticipated. The AHG investment was valued based on the results of the income and market valuation approaches.

The income approach utilized a discount rate based on a market-participant, risk-adjusted weighted average cost of capital, which considers industry required rates of return on debt and equity capital for a target industry capital structure adjusted for risks associated with size and geography. Other significant estimates and assumptions that drive our updated valuation of AHG include revenue growth rates and profit margins that were lower than those upon acquisition and our assessment of AHG's business improvement plan effectiveness.

Under the market approach, we estimated fair value based on market multiples of revenue and earnings derived from publicly-traded industrial gases companies engaged in similar lines of business, adjusted to reflect differences in size and growth prospects.

As of 30 September 2017, the carrying value of our investment in AHG is $66.7 and is reflected in our Industrial Gases – EMEA segment. The investment is reported in "Investment in net assets of and advances to equity affiliates" on our consolidated balance sheets.

Revenue Recognition – Percentage-of-Completion Method

Revenue from equipment sale contracts is recorded primarily using the percentage-of-completion method. Under this method, revenue from the sale of major equipment, such as liquefied natural gas (LNG) heat exchangers and large air separation units, is recognized based on costs or labor hours incurred to date compared with total estimated costs or labor hours to be incurred. We estimate the profit on a contract as the difference between the total estimated revenue and expected costs to complete the contract and recognize the profit over the life of the contract.

Accounting for contracts using the percentage-of-completion method requires management judgment relative to assessing risks and their impact on the estimate of revenues and costs. Our estimates are impacted by factors such as the potential for incentives or penalties on performance, schedule and technical issues, labor productivity, the complexity of work performed, the cost and availability of materials, and performance of subcontractors. When adjustments in estimated total contract revenues or estimated total costs or labor hours are required, any changes in the estimated profit from prior estimates are recognized in the current period for the inception-to-date effect of such change. When estimates of total costs to be incurred on a contract exceed estimates of total revenues to be earned, a provision for the entire estimated loss on the contract is recorded in the period in which the loss is determined.

Our Jazan large air separation unit sale of equipment project within our Industrial Gases – Global segment spans several years. In addition to the typical risks associated with underlying performance of project procurement and

construction activities, this project requires monitoring of risks associated with schedule, geography, and other aspects of the contract and their effects on our estimates of total revenues and total costs to complete the contract.

Changes in estimates on projects accounted for under the percentage-of-completion method, including the Jazan project, favorably impacted operating income by approximately $27 in fiscal year 2017 and $20 in fiscal year 2016. Our changes in estimates would not have significantly impacted amounts recorded in prior years. Changes in estimates during fiscal year 2015 were not significant.

We assess the performance of our sale of equipment projects as they progress. Our earnings could be positively or negatively impacted by changes to our forecast of revenues and costs on these projects.

Income Taxes

We account for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities measured using enacted tax rates in effect for the year in which the differences are expected to be recovered or settled. At 30 September 2017, accrued income taxes and net deferred tax liabilities amounted to $98.6 and $603.9, respectively. Tax liabilities related to uncertain tax positions as of 30 September 2017 were $146.4, excluding interest and penalties. Income tax expense for the year ended 30 September 2017 was $260.9. Disclosures related to income taxes are included in Note 22, Income Taxes, to the consolidated financial statements.

Management judgment is required concerning the ultimate outcome of tax contingencies and the realization of deferred tax assets.

Actual income taxes paid may vary from estimates, depending upon changes in income tax laws, actual results of operations, and the final audit of tax returns by taxing authorities. Tax assessments may arise several years after tax returns have been filed. We believe that our recorded tax liabilities adequately provide for these assessments.

Deferred tax assets are recorded for operating losses and tax credit carryforwards. However, when we do not expect sufficient sources of future taxable income to realize the benefit of the operating losses or tax credit carryforwards, these deferred tax assets are reduced by a valuation allowance. A valuation allowance is recognized if, based on the weight of available evidence, it is considered more likely than not that some portion or all of the deferred tax asset will not be realized. The factors used to assess the likelihood of realization include forecasted future taxable income and available tax planning strategies that could be implemented to realize or renew net deferred tax assets in order to avoid the potential loss of future tax benefits. The effect of a change in the valuation allowance is reported in the income tax expense.

A 1% point increase/decrease in our effective tax rate would decrease/increase net income by approximately $14.

Pension and Other Postretirement Benefits

The amounts recognized in the consolidated financial statements for pension and other postretirement benefits are determined on an actuarial basis utilizing numerous assumptions. The discussion that follows provides information on the significant assumptions and expense associated with the defined benefit plans.

Actuarial models are used in calculating the expense and liability related to the various defined benefit plans. These models have an underlying assumption that the employees render service over their service lives on a relatively consistent basis; therefore, the expense of benefits earned should follow a similar pattern.

Several assumptions and statistical variables are used in the models to calculate the expense and liability related to the plans. We determine assumptions about the discount rate, the expected rate of return on plan assets, and the rate of compensation increase. Note 16, Retirement Benefits, to the consolidated financial statements includes disclosure of these rates on a weighted-average basis for both the domestic and international plans. The actuarial models also use assumptions about demographic factors such as retirement age, mortality, and turnover rates. Mortality rates are based on the most recent Society of Actuaries tables. We believe the actuarial assumptions are reasonable. However, actual results could vary materially from these actuarial assumptions due to economic events and different rates of retirement, mortality, and turnover.

One of the assumptions used in the actuarial models is the discount rate used to measure benefit obligations. This rate reflects the prevailing market rate for high-quality, fixed-income debt instruments with maturities corresponding to the expected timing of benefit payments as of the annual measurement date for each of the various plans. Effective in 2016, the Company began to measure the service cost and interest cost components of pension expense by applying

spot rates along the yield curve to the relevant projected cash flows, as we believe this provides a better measurement of these costs. The Company accounted for this as a change in accounting

---

Table of Contents

estimate and, accordingly accounted for it on a prospective basis. This change did not affect the measurement of the total benefit obligation. The rate is used to discount the future cash flows of benefit obligations back to the measurement date. This rate changes from year-to-year based on market conditions that affect corporate bond yields. A higher discount rate decreases the present value of the benefit obligations and results in lower pension expense. A 50 bp increase/decrease in the discount rate decreases/increases pension expense by approximately $36 per year.

The expected rate of return on plan assets represents an estimate of the average rate of return to be earned by plan assets over the period that the benefits included in the benefit obligation are to be paid. The expected return on plan assets assumption is based on a weighted average of estimated long-term returns of major asset classes and the historical performance of plan assets. In determining estimated asset class returns, we take into account historical and future expected long-term returns and the value of active management, as well as the interest rate environment. Asset allocation is determined based on long-term return, volatility and correlation characteristics of the asset classes, the profiles of the plans' liabilities, and acceptable levels of risk. Lower returns on the plan assets result in higher pension expense. A 50 bp increase/decrease in the estimated rate of return on plan assets decreases/increases pension expense by approximately $19 per year.

We use a market-related valuation method for recognizing certain investment gains or losses for our significant pension plans. Investment gains or losses are the difference between the expected return and actual return on plan assets. The expected return on plan assets is determined based on a market-related value of plan assets. For equities, this is a calculated value that recognizes investment gains and losses in fair value related to equities over a five-year period from the year in which they occur and reduces year-to-year volatility. The market-related value for fixed income investments equals the actual fair value. Expense in future periods will be impacted as gains or losses are recognized in the market-related value of assets.

The expected rate of compensation increase is another key assumption. We determine this rate based on review of the underlying long-term salary increase trend characteristic of labor markets and historical experience, as well as comparison to peer companies. A 50 bp increase/decrease in the expected rate of compensation increases/decreases pension expense by approximately $15 per year.

Loss Contingencies

In the normal course of business, we encounter contingencies (i.e., situations involving varying degrees of uncertainty as to the outcome and effect on us). We accrue a liability for loss contingencies when it is considered probable that a liability has been incurred and the amount of loss can be reasonably estimated. When only a range of possible loss can be established, the most probable amount in the range is accrued. If no amount within
this range is a better estimate than any other amount within the range, the minimum amount in the range is accrued. Contingencies include those associated with litigation and environmental matters, for which our accounting policy is discussed in Note 1, Major Accounting Policies, to the consolidated financial statements, and particulars are provided in Note 17, Commitments and Contingencies, to the consolidated financial statements. Significant judgment is required in both determining probability and whether the amount of loss associated with a contingency can be reasonably estimated. These determinations are made based on the best available information at the time. As additional information becomes available, we reassess probability and estimates of loss contingencies. Revisions in the estimates associated with loss contingencies could have a significant impact on our results of operations in the period in which an accrual for loss contingencies is recorded or adjusted. For example, due to the inherent uncertainties related to environmental exposures, a significant increase to environmental liabilities could occur if a new site is designated, the scope of remediation is increased, or our proportionate share is increased. Similarly, a future charge for regulatory fines or damage awards associated with litigation could have a significant impact on our net income in the period in which it is recorded.

NEW ACCOUNTING GUIDANCE

In the first quarter of fiscal year 2017, we adopted guidance requiring that debt issuance costs related to a recognized debt liability be presented in the balance sheet as a direct deduction from the carrying amount of the debt instead of as a separate deferred asset. The guidance resulted in a reclassification adjustment that decreased other noncurrent assets by $17.0 with a corresponding decrease to long-term debt as of 30 September 2016. We have elected to continue to present debt issuance costs associated with a line-of-credit arrangement as a deferred asset, regardless of whether there

are any outstanding borrowings.
In addition, during the first quarter of fiscal year 2017, we adopted guidance that simplified the accounting for employee share-based payments. The new guidance requires excess tax benefits and deficiencies to be

Table of Contents

recognized in the income statement rather than in additional paid-in capital on the balance sheet. As a result of applying this change prospectively, we recognized $17.6 of excess tax benefits in our provision for income taxes during fiscal year 2017. Adoption of this guidance resulted in the presentation of excess tax benefits as an operating activity on the statement of cash flows rather than a financing activity. We applied these presentation changes retrospectively to all periods presented.

In the third quarter of fiscal year 2017, we elected to early adopt guidance which simplified the test for goodwill impairment by eliminating Step 2, which measured the impairment loss based on the fair value of goodwill. Under the new guidance, an impairment loss will be recognized for the amount by which the carrying amount of the reporting unit exceeds its fair value, not to exceed the total amount of goodwill allocated to that reporting unit. Refer to Note 10, Goodwill, for a discussion of our interim and annual goodwill impairment tests.

See Note 2, New Accounting Guidance, to the consolidated financial statements for information concerning the implementation and impact of new accounting guidance.

FORWARD-LOOKING STATEMENTS

This Management’s Discussion and Analysis contains “forward-looking statements” within the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, including statements about business outlook. These forward-looking statements are based on management’s reasonable expectations and assumptions as of the date of this report. Actual performance and financial results may differ materially from projections and estimates expressed in the forward-looking statements because of many factors not anticipated by management, including, without limitation, global or regional economic conditions and supply and demand dynamics in market segments into which the Company sells; political risks, including the risks of unanticipated government actions; acts of war or terrorism; the inability to eliminate stranded costs previously allocated to the Company's Electronic Materials and Performance Materials divisions, which have been divested, and other unexpected impacts of the divestitures; significant fluctuations in interest rates and foreign currencies from that currently anticipated; future financial and operating performance of major customers; unanticipated contract terminations or customer cancellations or postponement of projects and sales; our ability to execute the projects in our backlog; asset impairments due to economic conditions or specific events; the impact of price fluctuations in natural gas and disruptions in markets and the economy due to oil price volatility; costs and outcomes of litigation or regulatory investigations; the success of productivity and operational improvement programs; the timing, impact, and other uncertainties of future acquisitions or divestitures, including reputational impacts; the Company's ability to implement and operate with new technologies; the impact of changes in environmental, tax or other legislation, economic sanctions and regulatory activities in jurisdictions in which the Company and its affiliates operate; and other risk factors described in Part I, Item 1A. Risk Factors, of this Form 10-K. The Company disclaims any obligation or undertaking to disseminate any updates or revisions to any forward-looking statements contained in this report to reflect any change in the Company’s assumptions, beliefs or expectations or any change in events, conditions, or circumstances upon which any such forward-looking statements are based.

Table of Contents

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our earnings, cash flows, and financial position are exposed to market risks relating to fluctuations in interest rates and foreign currency exchange rates. It is our policy to minimize our cash flow exposure to adverse changes in currency exchange rates and to manage the financial risks inherent in funding with debt capital.

We address these financial exposures through a controlled program of risk management that includes the use of derivative financial instruments. We have established counterparty credit guidelines and generally enter into transactions with financial institutions of investment grade or better, thereby minimizing the risk of credit loss. All instruments are entered into for other than trading purposes. For details on the types and use of these derivative instruments and the major accounting policies, see Note 1, Major Accounting Policies, and Note 13, Financial Instruments, to the consolidated financial statements, for additional information. Additionally, we mitigate adverse energy price impacts through our cost pass-through contracts with customers and price increases.

Our derivative and other financial instruments consist of long-term debt (including current portion), interest rate swaps, cross currency interest rate swaps, and foreign exchange-forward contracts. The net market value of these financial instruments combined is referred to below as the net financial instrument position and is disclosed in Note 14, Fair Value Measurements, to the consolidated financial statements.

At 30 September 2017 and 2016, the net financial instrument position was a liability of $3,832.3 and $4,195.6, respectively. The decrease in the net financial instrument position was primarily due to the repayment of long-term debt.

The analysis below presents the sensitivity of the market value of our financial instruments to selected changes in market rates and prices. Market values are the present value of projected future cash flows based on the market rates and prices chosen. The market values for interest rate risk and foreign currency risk are calculated by us using a third-party software model that utilizes standard pricing models to determine the present value of the instruments based on market conditions (interest rates, spot and forward exchange rates, and implied volatilities) as of the valuation date.

Interest Rate Risk

Our debt portfolio as of 30 September 2017, including the effect of currency and interest rate swap agreements, was composed of 65% fixed-rate debt and 35% variable-rate debt. Our debt portfolio as of 30 September 2016, including the effect of currency and interest rate swap agreements, was composed of 55% fixed-rate debt and 45% variable-rate debt. The change in debt portfolio composition was due primarily to the repayment of commercial paper.

The sensitivity analysis related to the interest rate risk on the fixed portion of our debt portfolio assumes an instantaneous 100 bp move in interest rates from the level at 30 September 2017, with all other variables held constant. A 100 bp increase in market interest rates would result in a decrease of $112 and $137 in the net liability position of financial instruments at 30 September 2017 and 2016, respectively. A 100 bp decrease in market interest rates would result in an increase of $119 and $148 in the net liability position of financial instruments at 30 September 2017 and 2016, respectively.

Based on the variable-rate debt included in our debt portfolio, including the interest rate swap agreements, a 100 bp increase in interest rates would result in an additional $14 and $24 of interest incurred per year at the end of 30 September 2017 and 2016, respectively. A 100 bp decline in interest rates would lower interest incurred by $14 and $24 per year at 30 September 2017 and 2016, respectively.

Foreign Currency Exchange Rate Risk

The sensitivity analysis related to foreign currency exchange rates assumes an instantaneous 10% change in the foreign currency exchange rates from their levels at 30 September 2017 and 2016, with all other variables held constant. A 10% strengthening or weakening of the functional currency of an entity versus all other currencies would result in a decrease or increase, respectively, of $312 and $422 in the net liability position of financial instruments at 30 September 2017 and 2016, respectively. The change in exchange rate sensitivity from 30 September 2016 to 30 September 2017 was due primarily to a reduction in our portfolio of forward exchange contracts. Refer to Note 13, Financial Instruments, for additional information about our outstanding forward exchange contracts.

Table of Contents

The primary currency pair for which we have exchange rate exposure is Euros and U.S. Dollars. Foreign currency debt, cross currency interest rate swaps, and foreign exchange-forward contracts are used in countries where we do business, thereby reducing our net asset exposure. Foreign exchange-forward contracts and cross currency interest rate swaps are also used to hedge our firm and highly anticipated foreign currency cash flows. Thus, there is either an asset/liability or cash flow exposure related to all of the financial instruments in the above sensitivity analysis for which the impact of a movement in exchange rates would be in the opposite direction and materially equal to the impact on the instruments in the analysis.

The majority of the Company’s sales are derived from outside of the United States and denominated in foreign currencies. Financial results therefore will be affected by changes in foreign currency rates. The Euro and the Chinese Renminbi represent the largest exposures in terms of our foreign earnings. We estimate that a 10% reduction in either the Euro or the Chinese Renminbi versus the U.S. Dollar would lower our annual operating income by approximately $25 and $20, respectively.

Table of Contents

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Air Products' management is responsible for establishing and maintaining adequate internal control over financial reporting. Our internal control over financial reporting, which is defined in the following sentences, is a process designed to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with U.S. generally accepted accounting principles and includes those policies and procedures that:

(i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company;

(ii) provide reasonable assurance that the transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and

(iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Because of inherent limitations, internal control over financial reporting can only provide reasonable assurance and may not prevent or detect misstatements. Further, because of changes in conditions, the effectiveness of our internal control over financial reporting may vary over time. Our processes contain self-monitoring mechanisms, and actions are taken to correct deficiencies as they are identified.

Management has evaluated the effectiveness of its internal control over financial reporting based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this evaluation, management concluded that, as of 30 September 2017, the Company's internal control over financial reporting was effective.

KPMG LLP, an independent registered public accounting firm, has issued its opinion on the Company's internal control over financial reporting as of 30 September 2017 as stated in its report which appears herein.

/s/ Seifi Ghasemi	/s/ M. Scott Crocco
Seifi Ghasemi	M. Scott Crocco
Chairman, President, and	Executive Vice President and
Chief Executive Officer	Chief Financial Officer
16 November 2017	16 November 2017

Table of Contents

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Shareholders of Air Products and Chemicals, Inc.:

We have audited the accompanying consolidated balance sheets of Air Products and Chemicals, Inc. and Subsidiaries (the Company) as of 30 September 2017 and 2016, and the related consolidated income statements, consolidated comprehensive income statements, consolidated statements of cash flows, and equity for each of the years in the three-year period ended 30 September 2017. In connection with our audits of the consolidated financial statements, we also have audited the financial statement schedule referred to in Item 15(a)(2) in this Form 10-K. We have also audited the Company's internal control over financial reporting as of 30 September 2017, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. The Company's management is responsible for these consolidated financial statements and financial statement schedule, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying "Management's Report on Internal Control over Financial Reporting." Our responsibility is to express an opinion on these consolidated financial statements and financial statement schedule and an opinion on the Company's internal control over financial reporting based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the consolidated financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Air Products and Chemicals, Inc. and Subsidiaries as of 30 September 2017 and 2016, and the results of its operations and its cash flows for each of the years in the three-year period ended 30 September 2017, in conformity with U.S. generally accepted accounting principles. Also in our opinion, the related financial statement schedule, when considered in relation to the basic consolidated financial statements taken as a whole, presents fairly, in all material respects, the information set forth therein. Also in our opinion, Air Products and Chemicals, Inc. and Subsidiaries maintained, in all material respects, effective internal control over financial reporting as of 30 September 2017, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

/s/ KPMG LLP
Philadelphia, Pennsylvania
16 November 2017

Table of Contents

The Consolidated Financial Statements
Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED INCOME STATEMENTS

Year ended 30 September (Millions of dollars, except for share and per share data)	2017	2016	2015
Sales	$8,187.6	$7,503.7	$7,824.3
Cost of sales	5,753.4	5,176.6	5,598.2
Selling and administrative	715.6	685.0	773.0
Research and development	57.8	71.6	76.4
Business separation costs	30.2	50.6	7.5
Business restructuring and cost reduction actions	151.4	34.5	180.1
Pension settlement loss	10.5	5.1	19.3
Goodwill and intangible asset impairment charge	162.1	—	—
Gain on previously held equity interest	—	—	17.9
Other income (expense), net	121.0	49.4	45.5
Operating Income	1,427.6	1,529.7	1,233.2
Equity affiliates' income	80.1	147.0	152.3
Interest expense	120.6	115.2	102.8
Other non-operating income (expense), net	29.0	—	—
Loss on extinguishment of debt	—	6.9	16.6
Income From Continuing Operations Before Taxes	1,416.1	1,554.6	1,266.1
Income tax provision	260.9	432.6	300.2
Income From Continuing Operations	1,155.2	1,122.0	965.9
Income (Loss) From Discontinued Operations, net of tax	1,866.0	(460.5)	351.7
Net Income	3,021.2	661.5	1,317.6
Net Income Attributable to Noncontrolling Interests of Continuing Operations	20.8	22.5	32.6
Net Income Attributable to Noncontrolling Interests of Discontinued Operations	—	7.9	7.1
Net Income Attributable to Air Products	$3,000.4	$631.1	$1,277.9
Net Income Attributable to Air Products			
Income from continuing operations	$1,134.4	$1,099.5	$933.3
Income (Loss) from discontinued operations	1,866.0	(468.4)	344.6
Net Income Attributable to Air Products	$3,000.4	$631.1	$1,277.9
Basic Earnings Per Common Share Attributable to Air Products			
Income from continuing operations	$5.20	$5.08	$4.34
Income (Loss) from discontinued operations	8.56	(2.16)	1.61
Net Income Attributable to Air Products	$13.76	$2.92	$5.95
Diluted Earnings Per Common Share Attributable to Air Products			
Income from continuing operations	$5.16	$5.04	$4.29
Income (Loss) from discontinued operations	8.49	(2.15)	1.59
Net Income Attributable to Air Products	$13.65	$2.89	$5.88
Weighted Average Common Shares — Basic (in millions)	218.0	216.4	214.9
Weighted Average Common Shares — Diluted (in millions)	219.8	218.3	217.3

The accompanying notes are an integral part of these statements.

Table of Contents

Air Products and Chemicals, Inc. and Subsidiaries

CONSOLIDATED COMPREHENSIVE INCOME STATEMENTS

Year ended 30 September (Millions of dollars)	2017	2016	2015
Net Income	$3,021.2	$661.5	$1,317.6
Other Comprehensive Income (Loss), net of tax:			
Translation adjustments, net of tax of ($19.3), ($19.8), and $45.2	101.9	9.9	(699.3)
Net gain (loss) on derivatives, net of tax of ($11.0), $9.1, and ($16.0)	(12.6)	13.7	(35.0)
Pension and postretirement benefits, net of tax of $109.0, ($157.4), and ($148.5)	251.6	(335.1)	(278.5)
Reclassification adjustments:			
Currency translation adjustment	57.3	2.7	—
Derivatives, net of tax of $11.7, ($9.4), and $7.0	24.2	(36.0)	20.8
Pension and postretirement benefits, net of tax of $50.7, $43.0, and $47.7	110.7	87.2	97.0
Total Other Comprehensive Income (Loss)	533.1	(257.6)	(895.0)
Comprehensive Income	3,554.3	403.9	422.6
Net Income Attributable to Noncontrolling Interests	20.8	30.4	39.7
Other Comprehensive Income (Loss) Attributable to Noncontrolling Interests	3.7	4.8	(11.0)
Comprehensive Income Attributable to Air Products	$3,529.8	$368.7	$393.9

The accompanying notes are an integral part of these statements.

Table of Contents

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED BALANCE SHEETS

30 September (Millions of dollars, except for share data)	2017	2016
Assets		
Current Assets		
Cash and cash items	$3,273.6	$1,293.2
Short-term investments	404.0	—
Trade receivables, net	1,174.0	1,146.2
Inventories	335.4	255.0
Contracts in progress, less progress billings	84.8	64.6
Prepaid expenses	191.4	93.9
Other receivables and current assets	403.3	538.2
Current assets of discontinued operations	10.2	926.2
Total Current Assets	5,876.7	4,317.3
Investment in net assets of and advances to equity affiliates	1,286.9	1,283.6
Plant and equipment, net	8,440.2	8,259.7
Goodwill, net	721.5	845.1
Intangible assets, net	368.3	387.9
Noncurrent capital lease receivables	1,131.8	1,221.7
Other noncurrent assets	641.8	671.0
Noncurrent assets of discontinued operations	—	1,042.3
Total Noncurrent Assets	12,590.5	13,711.3
Total Assets	$18,467.2	$18,028.6
Liabilities and Equity		
Current Liabilities		
Payables and accrued liabilities	$1,814.3	$1,652.2
Accrued income taxes	98.6	117.9
Short-term borrowings	144.0	935.8
Current portion of long-term debt	416.4	365.4
Current liabilities of discontinued operations	15.7	211.8
Total Current Liabilities	2,489.0	3,283.1
Long-term debt	3,402.4	3,909.7
Other noncurrent liabilities	1,611.9	1,816.5
Deferred income taxes	778.4	710.4
Noncurrent liabilities of discontinued operations	—	1,095.5
Total Noncurrent Liabilities	5,792.7	7,532.1
Total Liabilities	8,281.7	10,815.2
Commitments and Contingencies – See Note 17		
Air Products Shareholders' Equity		
Common stock (par value $1 per share; issued 2017 and 2016 - 249,455,584 shares)	249.4	249.4
Capital in excess of par value	1,001.1	970.0
Retained earnings	12,846.6	10,475.5
Accumulated other comprehensive loss	(1,847.4)	(2,388.3)
Treasury stock, at cost (2017 - 31,109,510 shares; 2016 - 32,104,759 shares)	(2,163.5)	(2,227.0)
Total Air Products Shareholders' Equity	10,086.2	7,079.6
Noncontrolling Interests	99.3	133.8
Total Equity	10,185.5	7,213.4
Total Liabilities and Equity	$18,467.2	$18,028.6

The accompanying notes are an integral part of these statements.

Table of Contents

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED STATEMENTS OF CASH FLOWS

Year ended 30 September (Millions of dollars)	2017	2016	2015
Operating Activities			
Net income	$3,021.2	$661.5	$1,317.6
Less: Net income attributable to noncontrolling interests of continuing operations	20.8	22.5	32.6
Less: Net income attributable to noncontrolling interests of discontinued operations	—	7.9	7.1
Net income attributable to Air Products	3,000.4	631.1	1,277.9
(Income) Loss from discontinued operations attributable to Air Products	(1,866.0)	468.4	(344.6)
Income from continuing operations attributable to Air Products	1,134.4	1,099.5	933.3
Adjustments to reconcile income to cash provided by operating activities:			
Depreciation and amortization	865.8	854.6	858.5
Deferred income taxes	(38.0)	61.8	9.4
Loss on extinguishment of debt	—	6.9	16.6
Gain on previously held equity interest	—	—	(17.9)
Undistributed earnings of unconsolidated affiliates	(60.1)	(51.1)	(101.8)
Gain on sale of assets and investments	(24.3)	(7.3)	(29.7)
Share-based compensation	39.9	31.0	39.5
Noncurrent capital lease receivables	92.2	85.5	(10.1)
Goodwill and intangible asset impairment charge	162.1	—	—
Equity method investment impairment charge	79.5	—	—
Write-down of long-lived assets associated with restructuring	69.2	—	40.2
Other adjustments	165.4	156.7	53.0
Working capital changes that provided (used) cash, excluding effects of acquisitions and divestitures:			
Trade receivables	(73.6)	(44.8)	(40.7)
Inventories	6.4	32.2	38.0
Contracts in progress, less progress billings	(19.3)	28.2	16.9
Other receivables	124.7	(6.7)	48.9
Payables and accrued liabilities	163.8	60.1	134.9
Other working capital	(154.0)	(47.8)	58.0
Cash Provided by Operating Activities	2,534.1	2,258.8	2,047.0
Investing Activities			
Additions to plant and equipment	(1,039.7)	(907.7)	(1,162.4)
Acquisitions, less cash acquired	(8.2)	—	(34.5)
Investment in and advances to unconsolidated affiliates	(8.1)	—	(4.3)
Proceeds from sale of assets and investments	42.5	44.6	55.3
Purchases of investments	(2,692.6)	—	—
Proceeds from investments	2,290.7	—	—
Other investing activities	(2.3)	(1.7)	(.8)
Cash Used for Investing Activities	(1,417.7)	(864.8)	(1,146.7)
Financing Activities			
Long-term debt proceeds	2.4	386.9	340.3
Payments on long-term debt	(483.9)	(480.4)	(699.4)
Net (decrease) increase in commercial paper and short-term borrowings	(798.6)	(144.2)	285.2
Dividends paid to shareholders	(787.9)	(721.2)	(677.5)
Proceeds from stock option exercises	68.4	141.3	121.3
Payment for subsidiary shares to noncontrolling interests	—	—	(278.4)
Other financing activities	(41.3)	(42.6)	(51.9)

Cash Used for Financing Activities	(2,040.9)	(860.2)	(960.4)
Discontinued Operations			
Cash (used for) provided by operating activities	(966.2)	401.9	422.7
Cash provided by (used for) investing activities	3,750.6	(204.2)	(453.0)
Cash provided by (used for) financing activities	69.5	555.9	(16.9)
Cash (Used for) Provided by Discontinued Operations	2,853.9	753.6	(47.2)
Effect of Exchange Rate Changes on Cash	13.4	7.5	(22.9)
Increase (Decrease) in cash and cash items	1,942.8	1,294.9	(130.2)
Cash and Cash items – Beginning of Year	1,330.8	206.4	336.6
Cash and Cash Items – End of Period	$3,273.6	$1,501.3	$206.4
Less: Cash and Cash Items – Discontinued Operations	$—	$208.1	$23.3
Cash and Cash Items – Continuing Operations	$3,273.6	$1,293.2	$183.1

The accompanying notes are an integral part of these statements.

61

Table of Contents

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED STATEMENTS OF EQUITY

Year ended 30 September (Millions of dollars)	Common Stock	Capital in Excess of Par Value	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Treasury Stock	Air Products Shareholders Equity	Non-controlling Interests	Total Equity
Balance 30 September 2014	$ 249.4	$ 842.0	$ 9,993.2	$ (1,241.9)	$ (2,476.9)	$ 7,365.8	$ 155.6	$ 7,521.4
Net income			1,277.9			1,277.9	28.2	1,306.1
Other comprehensive loss				(884.0)		(884.0)	(11.0)	(895.0)
Cash dividends ($3.20 per share)			(687.9)			(687.9)		(687.9)
Share-based compensation expense		43.7				43.7		43.7
Issuance of treasury shares for stock option and award plans		(15.1)			117.3	102.2		102.2
Tax benefit of stock option and award plans		32.0				32.0		32.0
Dividends to noncontrolling interests							(38.0)	(38.0)
Purchase of noncontrolling interests		(.3)				(.3)	(.2)	(.5)
Other		2.4	(2.8)			(.4)	(2.5)	(2.9)
Balance 30 September 2015	$ 249.4	$ 904.7	$ 10,580.4	$ (2,125.9)	$ (2,359.6)	$ 7,249.0	$ 132.1	$ 7,381.1
Net income			631.1			631.1	30.4	661.5
Other comprehensive income (loss)				(262.4)		(262.4)	4.8	(257.6)
Cash dividends ($3.39 per share)			(733.7)			(733.7)		(733.7)
Share-based compensation expense		37.6				37.6		37.6
Issuance of treasury shares for stock option and award plans		(5.5)			132.6	127.1		127.1
Tax benefit of stock option and award plans		33.2				33.2		33.2
Dividends to noncontrolling interests							(33.6)	(33.6)
Other			(2.3)			(2.3)	.1	(2.2)
Balance 30 September 2016	$ 249.4	$ 970.0	$ 10,475.5	$ (2,388.3)	$ (2,227.0)	$ 7,079.6	$ 133.8	$ 7,213.4
Net income			3,000.4			3,000.4	20.8	3,021.2
Other comprehensive income				529.4		529.4	3.7	533.1
Cash dividends ($3.71 per share)			(808.5)			(808.5)		(808.5)
Share-based compensation expense		40.7				40.7		40.7
		(9.6)			63.5	53.9		53.9

Issuance of treasury shares for stock option and award plans								
Dividends to noncontrolling interests							(28.0)	(28.0)
Spin-off of Versum			175.0	11.5		186.5	(33.9)	152.6
Cumulative change in accounting principle			8.8			8.8		8.8
Other			(4.6)			(4.6)	2.9	(1.7)
Balance 30 September 2017	$ 249.4	$ 1,001.1	$ 12,846.6	$ (1,847.4)	$ (2,163.5)	$ 10,086.2	$ 99.3	$ 10,185.5

The accompanying notes are an integral part of these statements.

Table of Contents

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(Millions of dollars, except for share and per share data)

1 .	Major Accounting Policies	64
2 .	New Accounting Guidance	70
3 .	Discontinued Operations	72
4 .	Materials Technologies Separation	77
5 .	Business Restructuring and Cost Reduction Actions	77
6 .	Business Combination	79
7 .	Inventories	79
8 .	Summarized Financial Information of Equity Affiliates	79
9 .	Plant and Equipment, net	81
10.	Goodwill	82
11.	Intangible Assets	83
12.	Leases	84
13.	Financial Instruments	85
14.	Fair Value Measurements	89
15.	Debt	91
16.	Retirement Benefits	93
17.	Commitments and Contingencies	101
18.	Capital Stock	105
19.	Share-Based Compensation	105
20.	Accumulated Other Comprehensive Loss	109
21.	Earnings per Share	110
22.	Income Taxes	111
23.	Supplemental Information	114
24.	Summary by Quarter (Unaudited)	117
25.	Business Segment and Geographic Information	119

Table of Contents

1. MAJOR ACCOUNTING POLICIES

Basis of Presentation and Consolidation Principles

The accompanying consolidated financial statements of Air Products and Chemicals, Inc. were prepared in accordance with accounting principles generally accepted in the United States of America (“U.S. GAAP”) and include the accounts of Air Products and Chemicals, Inc. and those of its controlled subsidiaries (“we,” “our,” “us,” the “Company,” “Air Products,” or “registrant”), which are generally majority owned. Intercompany transactions and balances are eliminated in consolidation.

We consolidate all entities that we control. The general condition for control is ownership of a majority of the voting interests of an entity. Control may also exist in arrangements where we are the primary beneficiary of a variable interest entity (VIE). An entity that has both the power to direct the activities that most significantly impact the economic performance of a VIE and the obligation to absorb the losses or receive the benefits significant to the VIE is considered the primary beneficiary of that entity. We have determined that we are not a primary beneficiary in any material VIE.

Reclassifications

The results of the divisions comprising the former Materials Technologies segment and the former Energy from Waste segment have been presented as discontinued operations. Refer to Note 3, Discontinued Operations, for additional details. The results of operations and cash flows of these businesses have been removed from the results of continuing operations and segment results for all periods presented. The assets and liabilities of the discontinued operations have been reclassified and are segregated in the consolidated balance sheets. The comprehensive income related to these businesses has not been segregated and is included in the consolidated comprehensive income statement for all periods presented. The notes to the consolidated financial statements, unless otherwise indicated, are on a continuing operations basis. The term "total company" includes both continuing and discontinued operations.

The consolidated financial statements and accompanying notes reflect accounting guidance that was adopted during fiscal year 2017. Refer to Note 2, New Accounting Guidance, for additional information. Certain prior year information has been reclassified to conform to the fiscal year 2017 presentation.

Estimates and Assumptions

The preparation of the financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

Revenue Recognition

Revenue from product sales is recognized as risk and title to the product transfer to the customer (which generally occurs at the time shipment is made), the sales price is fixed or determinable, and collectability is reasonably assured. Sales returns and allowances are not a business practice in the industry.

Revenue from equipment sale contracts is recorded primarily using the percentage-of-completion method. Under this method, revenue from the sale of major equipment, such as liquefied natural gas (LNG) heat exchangers and large air separation units, is recognized based on costs or labor hours incurred to date compared with total estimated costs or labor hours to be incurred. When adjustments in estimated total contract revenues or estimated total costs or labor hours are required, any changes in the estimated profit from prior estimates are recognized in the current period for the inception-to-date effect of such change. Changes in estimates on projects accounted for under the percentage-of-completion method favorably impacted operating income by approximately $27 in fiscal year 2017 and approximately $20 in fiscal year 2016. Our changes in estimates would not have significantly impacted amounts recorded in prior years. Changes in estimates during fiscal year 2015 were not significant.

Table of Contents

Certain contracts associated with facilities that are built to provide product to a specific customer are required to be accounted for as leases. In cases where operating lease treatment is appropriate, there is no difference in revenue recognition over the life of the contract as compared to accounting for the contract as product sales. In cases where capital lease treatment is appropriate, the timing of revenue and expense recognition is impacted. Revenue and expense are recognized up front for the sale of equipment component of the contract as compared to revenue recognition over the life of the arrangement under contracts not qualifying as capital leases. Additionally, a portion of the revenue representing interest income from the financing component of the lease receivable is reflected as sales over the life of the contract. Allowances for credit losses associated with capital lease receivables are recorded using the specific identification method. As of 30 September 2017 and 2016, the credit quality of capital lease receivables did not require a material allowance for credit losses.

If an arrangement involves multiple deliverables, the delivered items are considered separate units of accounting if the items have value on a stand-alone basis. Revenues are allocated to each deliverable based upon relative selling prices derived from company specific evidence.

Amounts billed for shipping and handling fees are classified as sales in the consolidated income statements.

Amounts billed for sales and use taxes, value-added taxes, and certain excise and other specific transactional taxes imposed on revenue-producing transactions are presented on a net basis and excluded from sales in the consolidated income statements. We record a liability until remitted to the respective taxing authority.

Cost of Sales

Cost of sales predominantly represents the cost of tangible products sold. These costs include labor, raw materials, plant engineering, power, depreciation, production supplies and materials packaging costs, and maintenance costs. Costs incurred for shipping and handling are also included in cost of sales.

Depreciation

Depreciation is recorded using the straight-line method, which deducts equal amounts of the cost of each asset from earnings every year over its expected economic useful life. The principal lives for major classes of plant and equipment are summarized in Note 9, Plant and Equipment, net.

Selling and Administrative

The principal components of selling and administrative expenses are compensation, advertising, and promotional costs. Selling and administrative expenses also include costs for functional support previously provided to EMD and PMD and in support of transition services agreements with Versum and with Evonik, for which the reimbursement is reflected in "Other income (expense), net" on our consolidated income statements.

Postemployment Benefits

We provide termination benefits to employees as part of ongoing benefit arrangements and record a liability for termination benefits when probable and estimable. These criteria are met when management, with the appropriate level of authority, approves and commits to its plan of action for termination; the plan identifies the employees to be terminated and their related benefits; and the plan is to be completed within one year. We do not provide material one-time benefit arrangements.

Fair Value Measurements

We are required to measure certain assets and liabilities at fair value, either upon initial measurement or for subsequent accounting or reporting. For example, fair value is used in the initial measurement of net assets acquired in a business combination; on a recurring basis in the measurement of derivative financial instruments; and on a nonrecurring basis when long-lived assets are written down to fair value when held for sale or determined to be impaired. Refer to Note 14, Fair Value Measurements, for information on the methods and assumptions used in our fair value measurements.

Financial Instruments

We address certain financial exposures through a controlled program of risk management that includes the use of derivative financial instruments. The types of derivative financial instruments permitted for such risk management programs are specified in policies set by management. Refer to Note 13, Financial Instruments, for further detail on the types and use of derivative instruments into which we enter.

Major financial institutions are counterparties to all of these derivative contracts. We have established counterparty credit guidelines and generally enter into transactions with financial institutions of investment grade or better.

Table of Contents

Management believes the risk of incurring losses related to credit risk is remote, and any losses would be immaterial to the consolidated financial results, financial condition, or liquidity.

We recognize derivatives on the balance sheet at fair value. On the date the derivative instrument is entered into, we generally designate the derivative as either (1) a hedge of a forecasted transaction or of the variability of cash flows to be received or paid related to a recognized asset or liability (cash flow hedge), (2) a hedge of a net investment in a foreign operation (net investment hedge), or (3) a hedge of the fair value of a recognized asset or liability (fair value hedge).

The following details the accounting treatment of our cash flow, fair value, net investment, and non-designated hedges:

- Changes in the fair value of a derivative that is designated as and meets the cash flow hedge criteria are recorded in accumulated other comprehensive loss (AOCL) to the extent effective and then recognized in earnings when the hedged items affect earnings.
- Changes in the fair value of a derivative that is designated as and meets all the required criteria for a fair value hedge, along with the gain or loss on the hedged asset or liability that is attributable to the hedged risk, are recorded in current period earnings.
- Changes in the fair value of a derivative and foreign currency debt that are designated as and meet all the required criteria for a hedge of a net investment are recorded as translation adjustments in AOCL.
- Changes in the fair value of a derivative that is not designated as a hedge are recorded immediately in earnings.

We formally document the relationships between hedging instruments and hedged items, as well as our risk management objective and strategy for undertaking various hedge transactions. This process includes relating derivatives that are designated as fair value or cash flow hedges to specific assets and liabilities on the balance sheet or to specific firm commitments or forecasted transactions. We also formally assess, at the inception of the hedge and on an ongoing basis, whether derivatives are highly effective in offsetting changes in fair values or cash flows of the hedged item. If it is determined that a derivative is not highly effective as a hedge, or if a derivative ceases to be a highly effective hedge, we will discontinue hedge accounting with respect to that derivative prospectively.

Foreign Currency

Since we do business in many foreign countries, fluctuations in currency exchange rates affect our financial position and results of operations.

In most of our foreign operations, the local currency is considered the functional currency. Foreign subsidiaries translate their assets and liabilities into U.S. dollars at current exchange rates in effect at the end of the fiscal period. The gains or losses that result from this process are shown as translation adjustments in AOCL in the equity section of the balance sheet.

The revenue and expense accounts of foreign subsidiaries are translated into U.S. dollars at the average exchange rates that prevail during the period. Therefore, the U.S. dollar value of these items on the income statement fluctuates from period to period, depending on the value of the dollar against foreign currencies. Some transactions are made in currencies different from an entity’s functional currency. Gains and losses from these foreign currency transactions are generally reflected in "Other income (expense), net" on our consolidated income statements as they occur.

Environmental Expenditures

Accruals for environmental loss contingencies are recorded when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. Remediation costs are capitalized if the costs improve the Company’s property as compared with the condition of the property when originally constructed or acquired, or if the costs prevent environmental contamination from future operations. We expense environmental costs related to existing conditions resulting from past or current operations and from which no current or future benefit is discernible. The amounts charged to income from continuing operations related to environmental matters totaled $11.4, $12.2, and $11.8 in 2017, 2016, and 2015, respectively.

Table of Contents

The measurement of environmental liabilities is based on an evaluation of currently available information with respect to each individual site and considers factors such as existing technology, presently enacted laws and regulations, and prior experience in remediation of contaminated sites. An environmental liability related to cleanup of a contaminated site might include, for example, a provision for one or more of the following types of costs: site investigation and testing costs, cleanup costs, costs related to soil and water contamination resulting from tank ruptures, post-remediation monitoring costs, and outside legal fees. These liabilities include costs related to other potentially responsible parties to the extent that we have reason to believe such parties will not fully pay their proportionate share. They do not take into account any claims for recoveries from insurance or other parties and are not discounted.

As assessments and remediation progress at individual sites, the amount of projected cost is reviewed, and the liability is adjusted to reflect additional technical and legal information that becomes available. Management has an established process in place to identify and monitor the Company's environmental exposures. An environmental accrual analysis is prepared and maintained that lists all environmental loss contingencies, even where an accrual has not been established. This analysis assists in monitoring the Company's overall environmental exposure and serves as a tool to facilitate ongoing communication among the Company's technical experts, environmental managers, environmental lawyers, and financial management to ensure that required accruals are recorded and potential exposures disclosed.

Given inherent uncertainties in evaluating environmental exposures, actual costs to be incurred at identified sites in future periods may vary from the estimates. Refer to Note 17, Commitments and Contingencies, for additional information on the Company's environmental loss contingencies.

The accruals for environmental liabilities are reflected in the consolidated balance sheets, primarily as part of other noncurrent liabilities.

Litigation

In the normal course of business, we are involved in legal proceedings. We accrue a liability for such matters when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. When only a range of possible loss can be established, the most probable amount in the range is accrued. If no amount within this range is a better estimate than any other amount within the range, the minimum amount in the range is accrued. The accrual for a litigation loss contingency includes estimates of potential damages and other directly related costs expected to be incurred. Refer to Note 17, Commitments and Contingencies, for additional information on our current legal proceedings.

Share-Based Compensation

We have various share-based compensation programs, which include deferred stock units, stock options, and restricted stock. We expense the grant-date fair value of these awards over the vesting period during which employees perform related services. Expense recognition is accelerated for retirement-eligible individuals who would meet the requirements for vesting of awards upon their retirement. Refer to Note 19, Share-Based Compensation, for information on the models and assumptions used to determine the grant-date fair value of our awards.

Income Taxes

We account for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to be recovered or settled. A principal temporary difference results from the excess of tax depreciation over book depreciation because accelerated methods of depreciation and shorter useful lives are used for income tax purposes. The cumulative impact of a change in tax rates or regulations is included in income tax expense in the period that includes the enactment date. We recognize deferred tax assets net of existing valuation allowance to the extent we believe that these assets are more likely than not to be realized considering all available evidence.

A tax benefit for an uncertain tax position is recognized when it is more likely than not that the position will be sustained upon examination based on its technical merits. This position is measured as the largest amount of tax benefit that is greater than 50% likely of being realized. Interest and penalties related to unrecognized tax benefits are recognized as a component of income tax expense. For additional information regarding our income taxes, refer to Note 22, Income Taxes.

Table of Contents

Other Non-Operating Income (Expense), net

Beginning in the second quarter of fiscal year 2017, other non-operating income (expense), net includes interest income associated with our cash and cash items and short-term investments. Interest income was included in "Other income (expense), net" in 2016 and 2015. Interest income in previous periods was not material.

Cash and Cash Items

Cash and cash items include cash, time deposits, treasury securities, and certificates of deposit acquired with an original maturity of three months or less.

Short-term investments

Short-term investments include time deposits with original maturities greater than three months and less than one year.

Trade Receivables, net

Trade receivables comprise amounts owed to us through our operating activities and are presented net of allowances for doubtful accounts. The allowances for doubtful accounts represent estimated uncollectible receivables associated with potential customer defaults on contractual obligations. A provision for customer defaults is made on a general formula basis when it is determined that the risk of some default is probable and estimable but cannot yet be associated with specific customers. The assessment of the likelihood of customer defaults is based on various factors, including the length of time the receivables are past due, historical experience, and existing economic conditions. The allowance also includes amounts for certain customers where a risk of default has been specifically identified, considering factors such as the financial condition of the customer and customer disputes over contractual terms and conditions. Allowance for doubtful accounts were $93.5 and $55.3 as of fiscal year end 30 September 2017 and 2016, respectively. Provisions to the allowance for doubtful accounts charged against income were $45.8, $21.8 and $25.9 in 2017, 2016, and 2015, respectively.

Inventories

Inventories are stated at the lower of cost or market. We write down our inventories for estimated obsolescence or unmarketable inventory based upon assumptions about future demand and market conditions.

We utilize the last-in, first-out (LIFO) method for determining the cost of inventories in the United States for the Industrial Gases regional and global segments. Inventories for these segments outside of the United States are accounted for on the first-in, first-out (FIFO) method, as the LIFO method is generally not permitted in the foreign jurisdictions where these segments operate. At the business segment level, inventories are recorded at FIFO and the LIFO pool adjustments are not allocated to the business segments.

Equity Investments

The equity method of accounting is used when we exercise significant influence but do not have operating control, generally assumed to be 20% – 50% ownership. Under the equity method, original investments are recorded at cost and adjusted by our share of undistributed earnings or losses of these companies. Equity investments are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment may not be recoverable.

Plant and Equipment

Plant and equipment is stated at cost less accumulated depreciation. Construction costs, labor, and applicable overhead related to installations are capitalized. Expenditures for additions and improvements that extend the lives or increase the capacity of plant assets are capitalized. The costs of maintenance and repairs of plant and equipment are charged to expense as incurred.

Fully depreciated assets are retained in the gross plant and equipment and accumulated depreciation accounts until they are removed from service. In the case of disposals, assets and related depreciation are removed from the accounts, and the net amounts, less proceeds from disposal, are included in income. Refer to Note 9, Plant and Equipment, net, for further detail.

Table of Contents

Computer Software

We capitalize costs incurred to purchase or develop software for internal use. Capitalized costs include purchased computer software packages, payments to vendors/consultants for development and implementation or modification to a purchased package to meet our requirements, payroll and related costs for employees directly involved in development, and interest incurred while software is being developed. Capitalized computer software costs are reflected in "Plant and equipment, net" on the consolidated balance sheets and are depreciated over the estimated useful life of the software, generally a period of three to ten years.

Capitalized Interest

As we build new plant and equipment, we include in the cost of these assets a portion of the interest payments we make during the year. The amount of capitalized interest was $19.0, $32.7, and $49.1 in 2017, 2016, and 2015, respectively.

Impairment of Long-Lived Assets

Long-lived assets are grouped for impairment testing at the lowest level for which there are identifiable cash flows that are largely independent of the cash flows of other assets and liabilities and are evaluated for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset group may not be recoverable. We assess recoverability by comparing the carrying amount of the asset group to estimated undiscounted future cash flows expected to be generated by the asset group. If an asset group is considered impaired, the impairment loss to be recognized is measured as the amount by which the asset group’s carrying amount exceeds its fair value. Long-lived assets to be sold are reported at the lower of carrying amount or fair value less cost to sell.

Asset Retirement Obligations

The fair value of a liability for an asset retirement obligation is recognized in the period in which it is incurred. The fair value of the liability is measured using discounted estimated cash flows and is adjusted to its present value in subsequent periods as accretion expense is recorded. The corresponding asset retirement costs are capitalized as part of the carrying amount of the related long-lived asset and depreciated over the asset’s useful life. Our asset retirement obligations are primarily associated with on-site long-term supply contracts, under which we have built a facility on land owned by the customer and are obligated to remove the facility at the end of the contract term. Our asset retirement obligations totaled $144.7 and $119.9 at 30 September 2017 and 2016, respectively.

Goodwill

Business combinations are accounted for using the acquisition method. The purchase price is allocated to the assets acquired and liabilities assumed based on their estimated fair market values. Any excess purchase price over the fair market value of the net assets acquired, including identified intangibles, is recorded as goodwill. Preliminary purchase price allocations are made at the date of acquisition and finalized when information needed to affirm underlying estimates is obtained, within a maximum allocation period of one year.

Goodwill is subject to impairment testing at least annually. In addition, goodwill is tested more frequently if a change in circumstances or the occurrence of events indicates that potential impairment exists. Refer to Note 10, Goodwill, for further detail.

Intangible Assets

Intangible assets with determinable lives primarily consist of customer relationships, purchased patents and technology, and land use rights. The cost of intangible assets with determinable lives is amortized on a straight-line basis over the estimated period of economic benefit. No residual value is estimated for these intangible assets. Indefinite-lived intangible assets consist of trade names and trademarks. Indefinite-lived intangibles are subject to impairment testing at least annually. In addition, intangible assets are tested more frequently if a change in circumstances or the occurrence of events indicates that potential impairment exists.

Customer relationships are generally amortized over periods of five to twenty-five years. Purchased patents and technology and other are generally amortized over periods of five to fifteen years. Land use rights, which are included in other intangibles, are generally amortized over a period of fifty years. Amortizable lives are adjusted whenever there is a change in the estimated period of economic benefit. Refer to Note 11, Intangible Assets, for further detail.

Table of Contents

Retirement Benefits

The cost of pension benefits is recognized over the employees' service period. We use actuarial methods and assumptions in the valuation of defined benefit obligations and the determination of expense. Differences between actual and expected results or changes in the value of obligations and plan assets are not recognized in earnings as they occur but, rather, systematically and gradually over subsequent periods. Refer to Note 16, Retirement Benefits, for disclosures related to our pension and other postretirement benefits.

2. NEW ACCOUNTING GUIDANCE

Accounting Guidance Implemented in 2017

Simplifying Goodwill Impairment Test

In January 2017, the Financial Accounting Standards Board (FASB) issued guidance to simplify the test for goodwill impairment by eliminating Step 2, which measured the impairment loss based on the fair value of goodwill. Under the new guidance, an impairment loss will be recognized for the amount by which the carrying amount of the reporting unit exceeds its fair value, not to exceed the total amount of goodwill allocated to that reporting unit. The guidance is effective for annual or interim goodwill impairments tests conducted in fiscal year 2021, with early adoption permitted, and should be applied prospectively. We elected to early adopt this guidance during the third quarter of fiscal year 2017.

Share-Based Compensation

In March 2016, the FASB issued an update to simplify the accounting for employee share-based payments, including the income tax impacts, the classification on the statement of cash flows, and forfeitures. We elected to early adopt this guidance in the first quarter of fiscal year 2017. The new guidance requires excess tax benefits and deficiencies to be recognized in the income statement rather than in additional paid-in capital on the balance sheet. As a result of applying this change prospectively, we recognized $17.6 of excess tax benefits in our provision for income taxes during fiscal year 2017. In addition, adoption of the new guidance resulted in an $8.8 cumulative-effect adjustment to retained earnings as of 1 October 2016 to recognize deferred taxes for U.S. state net operating loss and other carryforwards attributable to excess tax benefits. We retrospectively applied the guidance on cash flow presentation, which requires excess tax benefits to be presented as an operating activity rather than as a financing activity. Cash paid on employees' behalf related to shares withheld for tax purposes continues to be classified as a financing activity. Forfeitures have not been significant historically. We have elected to account for forfeitures as they occur, rather than to estimate them.

Share-Based Compensation Modification Accounting

In May 2017, the FASB issued an update to amend the scope of modification accounting associated with share-based payment awards. The guidance limits the use of modification accounting to instances where the fair value, vesting conditions, or award classification are different immediately before and after the modification. This guidance is effective in fiscal year 2019, with early adoption permitted, and should be applied prospectively. We adopted this guidance during the fourth quarter of fiscal year 2017. This guidance did not have a significant impact on our consolidated financial statements upon adoption.

Consolidation Analysis

In February 2015, the FASB issued an update to amend current consolidation guidance. The guidance impacts the analysis an entity must perform in determining if it should consolidate certain legal entities such as limited partnerships, limited liability corporations, and securitization structures. We adopted this guidance in the first quarter of fiscal year 2017. This guidance did not have a significant impact on our consolidated financial statements upon adoption.

Debt Issuance Costs

In April 2015, the FASB issued guidance requiring that debt issuance costs related to a recognized debt liability be presented in the balance sheet as a direct deduction from the carrying amount of the debt instead of as a separate deferred asset. In addition, guidance was issued to allow for a policy election on the presentation of debt issuance costs associated with a line-of-credit arrangement, regardless of whether there are any outstanding borrowings. We adopted the guidance during the first quarter of fiscal year 2017 on a retrospective basis. The guidance resulted in a

reclassification adjustment that decreased other noncurrent assets by $17.0 with a corresponding decrease to

---

Table of Contents

long-term debt as of 30 September 2016. We will continue to present debt issuance costs associated with a line-of-credit arrangement as a deferred asset, regardless of whether there are any outstanding borrowings. Adoption of this guidance also impacted the presentation of debt issuance costs related to our discontinued operations. As of 30 September 2016, noncurrent assets and noncurrent liabilities of discontinued operations were both reduced by $9.6.

Definition of a Business

In January 2017, the FASB issued guidance that clarifies the definition of a business to assist in determining whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. Under the new guidance, fewer transactions are expected to be accounted for as business combinations. We elected to early adopt this guidance prospectively beginning in the first quarter of fiscal year 2017. This guidance did not have a significant impact on our consolidated financial statements upon adoption.

New Accounting Guidance to be Implemented

Revenue Recognition

In May 2014, the FASB issued guidance based on the principle that revenue is recognized in an amount expected to be collected and to which the entity expects to be entitled in exchange for the transfer of goods or services. We have the option to adopt the standard in either fiscal year 2018 or 2019, either retrospectively or as a cumulative-effect adjustment as of the date of adoption under the modified retrospective approach. We expect to adopt this guidance in fiscal year 2019 under the modified retrospective approach, which will result in a cumulative-effect adjustment as of 1 October 2018. To date, we have focused on identifying potential impacts on our onsite gases and sale of equipment businesses and on efforts needed to meet the expanded disclosure requirements. Our evaluation of the effect of the new standard will extend over future periods.

Leases

In February 2016, the FASB issued guidance which requires lessees to recognize a right-of-use asset and lease liability on the balance sheet for all leases, including operating leases, with a term in excess of 12 months. The guidance also expands the quantitative and qualitative disclosure requirements. The guidance is effective in fiscal year 2020, with early adoption permitted, and must be applied using a modified retrospective approach. We are currently evaluating the impact of adopting this new guidance on the consolidated financial statements, including the assessment of our current lease population under the revised definition of what qualifies as a leased asset. The Company is the lessee under various agreements for real estate, distribution equipment, aircraft, and vehicles that are currently accounted for as operating leases as discussed in Note 12, Leases. The new guidance will require the Company to record operating leases on the balance sheet with a right-of-use asset and corresponding liability for future payment obligations. The Company is currently considered the lessor under certain agreements associated with facilities that are built to provide product to a specific customer.

Derivative Contract Novations

In March 2016, the FASB issued guidance to clarify that a change in the counterparty to a derivative instrument that has been designated as a hedging instrument does not, in and of itself, require re-designation of that hedging relationship provided that all other hedge accounting criteria continue to be met. This guidance is effective in fiscal year 2018, with early adoption permitted. We do not expect adoption of this guidance to have a significant impact on our consolidated financial statements.

Credit Losses on Financial Instruments

In June 2016, the FASB issued an update on the measurement of credit losses, which requires measurement and recognition of expected credit losses for financial assets, including trade receivables and capital lease receivables, held at the reporting date based on historical experience, current conditions, and reasonable and supportable forecasts. The method to determine a loss is different from the existing guidance, which requires a credit loss to be recognized when it is probable. The guidance is effective beginning in fiscal year 2021, with early adoption permitted beginning in fiscal year 2020. We are currently evaluating the impact this update will have on our consolidated financial statements.

Cash Flow Statement Classification

In August 2016, the FASB issued guidance to reduce diversity in practice on how certain cash receipts and cash payments are classified in the statement of cash flows. The guidance is effective beginning fiscal year 2019, with early adoption permitted, and should be applied retrospectively. We are currently evaluating the impact of adopting this new guidance on the consolidated financial statements

Table of Contents

Intra-Entity Asset Transfers

In October 2016, the FASB issued guidance on the accounting for the income tax effects of intra-entity transfers of assets other than inventory. Current GAAP prohibits the recognition of current and deferred income taxes for an intra-entity asset transfer until the asset has been sold to an outside party. Under the new guidance, the income tax consequences of an intra-entity asset transfer are recognized when the transfer occurs. The guidance is effective beginning in fiscal year 2019, with early adoption permitted as of the beginning of an annual reporting period. The guidance must be applied on a modified retrospective basis through a cumulative-effect adjustment directly to retained earnings as of the date of adoption. We are currently evaluating the impact this guidance will have on our consolidated financial statements and plan to adopt the guidance in fiscal year 2019.

Derecognition of Nonfinancial Assets

In February 2017, the FASB issued an update to clarify the scope of guidance on gains and losses from the derecognition of nonfinancial assets and to add guidance for partial sales of nonfinancial assets. The update must be adopted at the same time as the new guidance on revenue recognition discussed above, which we intend to adopt in fiscal year 2019. The guidance may be applied retrospectively or with a cumulative-effect adjustment to retained earnings at the date of adoption. We are currently evaluating the impact this update will have on our consolidated financial statements.

Presentation of Net Periodic Pension and Postretirement Benefit Cost

In March 2017, the FASB issued guidance for improving the presentation of net periodic pension cost and net periodic postretirement benefit cost. The amendments require that the service cost component of the net periodic benefit cost be presented in the same line items as other compensation costs arising from services rendered by employees during the period. The other components of net periodic benefit cost (e.g., interest cost, expected return on plan assets, and amortization of actuarial gains/losses) should be presented in the income statement separately from the service cost component and outside of operating income. The amendments also allow only the service cost component to be eligible for capitalization when applicable. The guidance is effective beginning in fiscal year 2019, with early adoption permitted as of the beginning of fiscal year 2018. The amendments should be applied retrospectively for the presentation requirements and prospectively for the capitalization of the service cost component requirements. We expect to early adopt this guidance beginning fiscal year 2018.

We currently classify all net periodic pension costs within operating costs, primarily within cost of sales and selling and administrative expense. The line item classification changes required by the new guidance will not impact the Company's pretax earnings or net income; however, operating income and other non-operating income (expense), net will change by offsetting amounts that are not expected to be material to the Company's consolidated financial statements.

Hedging Activities

In August 2017, the FASB issued guidance on hedging activities to expand the related presentation and disclosure requirements, change how companies assess effectiveness, and eliminate the separate measurement and reporting of hedge ineffectiveness. The guidance also enables more financial and nonfinancial hedging strategies to become eligible for hedge accounting. The guidance is effective in fiscal year 2020, with early adoption permitted. For cash flow and net investment hedges existing at the date of adoption, an entity should apply a cumulative-effect adjustment to eliminate the separate measurement of ineffectiveness within equity as of the beginning of the fiscal year the guidance is adopted. The amended presentation and disclosure guidance is applied prospectively. We are currently evaluating the impact this guidance will have on our consolidated financial statements.

3. DISCONTINUED OPERATIONS

Materials Technologies

On 16 September 2015, we announced plans to separate our Materials Technologies segment, which contained two divisions, the Electronic Materials Division (EMD) and the Performance Materials Division (PMD). As further discussed below, we completed the separation of EMD through the spin-off of Versum Materials, Inc. (Versum) and the sale of PMD to Evonik Industries AG (Evonik) in fiscal year 2017. As a result, these divisions are reflected in our consolidated financial statements as discontinued operations for all periods presented.

Spin-off of EMD

On 1 October 2016 (the distribution date), Air Products completed the spin-off of Versum into a separate and independent public company. The spin-off was completed by way of a distribution to Air Products’ stockholders of all of the then issued and outstanding shares of common stock of Versum on the basis of one share of Versum common stock for every two shares of Air Products’ common stock held as of the close of business on 21 September 2016 (the record date for the distribution). Fractional shares of Versum common stock were not distributed to Air Products' common stockholders. Air Products’ stockholders received cash in lieu of fractional shares. As a result of the distribution, Versum is now an independent public company, and its common stock is listed under the symbol “VSM” on the New York Stock Exchange. The spin-off of Versum was treated as a noncash transaction in the consolidated statements of cash flows in fiscal year 2017.

Sale of PMD

On 3 January 2017, we completed the sale of PMD to Evonik for $3.8 billion in cash. A gain of $2,870 ($1,828 after tax, or $8.32 per share) was recognized on the sale. A portion of the proceeds from the sale have been included in "Short-term investments" on the consolidated balance sheets. Interest income earned on the sale proceeds has been reflected on the consolidated income statements within “Other non-operating income (expense), net."

Energy-from-Waste

On 29 March 2016, the Board of Directors approved the Company’s exit of its Energy from Waste (EfW) business and efforts to start up and operate the two EfW projects located in Tees Valley, United Kingdom, were discontinued. Since that time, the EfW segment has been presented as a discontinued operation.

During the second quarter of fiscal year 2016, we recorded a loss of $945.7 ($846.6 after-tax) to write down plant assets to their estimated net realizable value and record a liability for plant disposition and other costs. Income tax benefits related only to one of the projects as the other did not qualify for a local tax deduction. We estimated the net realizable value of the projects assuming an orderly liquidation of assets capable of being marketed on a secondary equipment market based on market quotes and our experience with selling similar equipment. An asset’s orderly liquidation value is the amount that could be realized from a liquidation sale, given a reasonable period of time to find a buyer, selling the asset in the existing condition where it is located, and assuming the highest and best use of the asset by market participants. A valuation allowance of $58.0 and unrecognized tax benefits of $7.9 were recorded relating to deferred tax assets on capital assets generated from the loss.

During the first quarter of fiscal year 2017, we determined that it is unlikely for a buyer to assume the remaining assets and contract obligations, including land lease obligations. As a result, we recorded an additional loss of $59.3 ($47.1 after-tax) in results of discontinued operations, of which $53.0 was recorded primarily for land lease obligations and $6.3 was recorded to update our estimate of the net realizable value of the plant assets as of 31 December 2016. There have been no changes to our estimates during the remainder of fiscal year 2017. We may incur additional exit costs in future periods related to other outstanding commitments.

Table of Contents

The following table summarizes the carrying amount of the accrual for our actions to dispose of the EfW business at 30 September 2017:

	Asset Actions	Contract Actions/ Other	Total
Loss on disposal of business	$913.5	$ 32.2	$945.7
Noncash expenses	(913.5)	—	(913.5)
Cash expenditures	—	(18.6)	(18.6)
Currency translation adjustment	—	(1.4)	(1.4)
30 September 2016	$—	$ 12.2	$12.2
Loss on disposal of business	6.3	53.0	59.3
Noncash expenses	(6.3)	—	(6.3)
Cash expenditures	—	(1.4)	(1.4)
Currency translation adjustment	—	7.3	7.3
Amount reflected in other noncurrent liabilities	—	(65.3)	(65.3)
30 September 2017	$—	$ 5.8	$5.8

The loss on disposal was recorded as a component of discontinued operations. The amount reflected in other noncurrent liabilities primarily relates to land lease obligations and is recorded in continuing operations. The remaining accrual is reflected in current liabilities of discontinued operations.

Summarized Financial Information of Discontinued Operations

The following tables detail the businesses and major line items that comprise income from discontinued operations, net of tax, on the consolidated income statements:

Year Ended 30 September 2017	Performance Materials	Energy-from-Waste[(A)]	Total Discontinued Operations
Sales	$ 254.8	$ —	$ 254.8
Cost of sales	182.3	13.8	196.1
Selling and administrative	22.5	.7	23.2
Research and development	5.1	—	5.1
Other income (expense), net	.3	(2.0)	(1.7)
Operating Income (Loss)	45.2	(16.5)	28.7
Equity affiliates' income	.3	—	.3
Income (Loss) Before Taxes	45.5	(16.5)	29.0
Income tax benefit[(B)]	(50.8)	(5.7)	(56.5)
Income (Loss) From Operations of Discontinued Operations, net of tax	96.3	(10.8)	85.5
Gain (Loss) on Disposal, net of tax[(C)]	1,827.6	(47.1)	1,780.5
Income (Loss) From Discontinued Operations, net of tax	$ 1,923.9	$ (57.9)	$ 1,866.0

(A) The loss from operations of discontinued operations for EfW primarily relates to costs incurred for ongoing project exit activities, administrative costs, and land lease obligations.

(B) As a result of the expected gain on sale of PMD, we released valuation allowances related to capital loss and net operating loss carryforwards primarily during the first quarter of 2017 that favorably impacted our income tax provision within discontinued operations by approximately $69.

(C) After-tax gain on sale of $1,827.6 includes expense for income tax reserves for uncertain tax positions of $28.0 gross ($21.0 net) in various jurisdictions.

Table of Contents

Year Ended 30 September 2016	Electronic Materials	Performance Materials	Energy-from-Waste[(A)]	Total Discontinued Operations
Sales	$ 961.6	$ 1,059.1	$ —	$ 2,020.7
Cost of sales	521.6	704.5	24.6	1,250.7
Selling and administrative	87.7	76.6	2.8	167.1
Research and development	40.8	19.6	.9	61.3
Other income (expense), net	2.2	4.2	(12.7)	(6.3)
Operating Income (Loss)	313.7	262.6	(41.0)	535.3
Equity affiliates' income	.2	1.4	—	1.6
Interest expense	.3	—	—	.3
Income (Loss) Before Taxes[(B)]	313.6	264.0	(41.0)	536.6
Income tax provision (benefit)	73.4	80.5	(3.4)	150.5
Income (Loss) From Operations of Discontinued Operations, net of tax	240.2	183.5	(37.6)	386.1
Loss on Disposal, net of tax	—	—	(846.6)	(846.6)
Income (Loss) From Discontinued Operations, net of tax	240.2	183.5	(884.2)	(460.5)
Net Income Attributable to Noncontrolling Interests of Discontinued Operations	7.9	—	—	7.9
Net Income (Loss) From Discontinued Operations	$ 232.3	$ 183.5	$ (884.2)	$ (468.4)

(A) The loss from operations of discontinued operations for EfW primarily relates to project suspension costs, land lease obligations, and administrative costs.

(B) In fiscal year 2016, income before taxes from operations of discontinued operations attributable to Air Products was $527.1.

Year Ended 30 September 2015	Electronic Materials	Performance Materials	Energy-from-Waste[(A)]	Total Discontinued Operations
Sales	$ 984.1	$ 1,086.5	$ —	$ 2,070.6
Cost of sales	586.8	754.0	5.1	1,345.9
Selling and administrative	86.4	79.9	2.4	168.7
Research and development	37.5	23.2	1.7	62.4
Other income (expense), net[(B)]	(18.5)	(9.2)	—	(27.7)
Operating Income (Loss)	254.9	220.2	(9.2)	465.9
Equity affiliates' income	1.0	1.2	—	2.2
Interest expense	.1	.6	—	.7
Income (Loss) Before Taxes[(C)]	255.8	220.8	(9.2)	467.4
Income tax provision (benefit)	49.7	68.4	(2.4)	115.7
Income (Loss) From Discontinued Operations, net of tax	206.1	152.4	(6.8)	351.7
Net Income Attributable to Noncontrolling Interests of Discontinued Operations	7.1	—	—	7.1
Net Income (Loss) From Discontinued Operations	$ 199.0	$ 152.4	$ (6.8)	$ 344.6

(A) The loss from operations of discontinued operations for EfW primarily relates to land lease obligations and administrative costs.

(B) Primarily includes business restructuring and cost reduction actions.

(C) In fiscal year 2015, income before taxes from operations of discontinued operations attributable to Air Products was $458.9.

Table of Contents

The following tables detail the businesses and major line items that comprise assets and liabilities of discontinued operations on the consolidated balance sheets:

30 September 2017	Performance Materials	Energy-from-Waste	Total Discontinued Operations
Assets			
Current Assets			
Plant and equipment, net	$ —	$ 10.2	$ 10.2
Total Current Assets	—	10.2	10.2
Total Assets	$ —	$ 10.2	$ 10.2
Liabilities			
Current Liabilities			
Payables and accrued liabilities	$ 9.2	$ 6.5	$ 15.7
Total Current Liabilities	9.2	6.5	15.7
Total Liabilities	$ 9.2	$ 6.5	$ 15.7

30 September 2016	Electronic Materials	Performance Materials	Energy-from-Waste	Total Discontinued Operations
Assets				
Current Assets				
Cash and cash items	$ 170.6	$ 37.5	$ —	$ 208.1
Trade receivables, net	134.7	159.0	—	293.7
Inventories	138.1	226.8	—	364.9
Plant and equipment, net	—	—	18.2	18.2
Other receivables and current assets	34.5	5.6	1.2	41.3
Total Current Assets	477.9	428.9	19.4	926.2
Plant and equipment, net	296.5	296.5	—	593.0
Goodwill, net	180.0	125.0	—	305.0
Intangible assets, net	75.1	25.0	—	100.1
Other noncurrent assets	37.5	6.7	—	44.2
Total Noncurrent Assets	589.1	453.2	—	1,042.3
Total Assets	$ 1,067.0	$ 882.1	$ 19.4	$ 1,968.5
Liabilities				
Current Liabilities				
Payables and accrued liabilities	$ 85.8	$ 72.5	$ 19.0	$ 177.3
Accrued income taxes	22.7	6.0	—	28.7
Current portion of long-term debt	5.8	—	—	5.8
Total Current Liabilities	114.3	78.5	19.0	211.8
Long-term debt	981.8	—	—	981.8
Deferred income taxes	50.3	6.4	—	56.7
Other noncurrent liabilities	47.4	9.6	—	57.0
Total Noncurrent Liabilities	1,079.5	16.0	—	1,095.5
Total Liabilities	$ 1,193.8	$ 94.5	$ 19.0	$ 1,307.3

Table of Contents

4. MATERIALS TECHNOLOGIES SEPARATION

Business Separation Costs

In connection with the disposition of the divisions comprising the former Materials Technologies segment, we incurred separation costs of $30.2, $50.6, and $7.5 in 2017, 2016, and 2015, respectively. These costs are reflected on the consolidated income statements as “Business separation costs” and include legal, advisory, and pension related costs. Our fiscal year 2017 income tax provision includes net tax benefits of $5.5 primarily related to changes in tax positions on business separation activities. Our fiscal year 2016 income tax provision includes additional tax expense related to the separation of $51.8, of which $45.7 resulted from a dividend that was declared in June 2016 to repatriate $443.8 from a subsidiary in South Korea to the U.S. in anticipation of the separation of EMD from the industrial gases business in South Korea.

Transition Services Agreements

In connection with the spin-off of Versum, we entered into various agreements necessary to effect the spin-off and to govern the ongoing relationships between Air Products and Versum after the separation, including a transition services agreement by which we provide certain transition services to Versum. We expect all transition services to end in 2018. Seifi Ghasemi, chairman, president and chief executive officer of Air Products, is serving as non executive chairman of the Versum Board of Directors.

In connection with the sale of PMD, we entered into a transition services agreement by which we provide certain transition services to Evonik for no longer than 12 months from the date of sale of 3 January 2017.

The reimbursement for costs in support of the transition services agreements with Versum and Evonik has been reflected on the consolidated income statements within “Other income (expense), net.”

Loss on Extinguishment of Debt

On 30 September 2016, in anticipation of the spin-off, Versum entered into certain financing transactions to allow for a cash distribution of $550.0 and a distribution in-kind of senior unsecured notes (the "Notes") issued by Versum with an aggregate principal amount of $425.0 to Air Products. Air Products then exchanged these Notes with certain financial institutions for $418.3 of Air Products’ outstanding commercial paper. This noncash exchange, which was excluded from the consolidated statements of cash flows, resulted in a loss of $6.9 that has been reflected on the consolidated income statements as “Loss on extinguishment of debt.” This loss was deductible for tax purposes.

5. BUSINESS RESTRUCTURING AND COST REDUCTION ACTIONS

The charges we record for business restructuring and cost reduction actions have been excluded from segment operating income.

Cost Reduction Actions

In fiscal year 2017, we recognized a net expense of $151.4. The year-to-date net expense included a charge of $154.8 for actions taken during fiscal year 2017, partially offset by the favorable settlement of the remaining $3.4 accrued balance associated with business restructuring actions taken in 2015. Asset actions of $88.5 included charges resulting from the write-down of an air separation unit in the Industrial Gases – EMEA segment that was constructed mainly to provide oxygen to one of the Energy-from-Waste plants, the planned sale of a non-industrial gas hardgoods business in the Industrial Gases – Americas segment, and the closure of a facility in the Corporate and other segment that manufactured liquefied natural gas (LNG) heat exchangers. During fiscal year 2017, severance and other benefits totaled $66.3 and related to the elimination or planned elimination of approximately 625 positions, primarily in the Corporate and other segment and in the Industrial Gases – EMEA segment. The actions in the Corporate and other segment were driven by the reorganization of our engineering, manufacturing, and technology functions.

The 2017 charge related to the segments as follows: $39.3 in Industrial Gases – Americas, $77.9 in Industrial Gases – EMEA, $.9 in Industrial Gases – Asia, $2.5 in Industrial Gases – Global, and $34.2 in Corporate and other.

In fiscal year 2016, we recognized an expense of $34.5 for severance and other benefits related to cost reduction actions which resulted in the elimination of approximately 610 positions. The expenses related primarily to the Industrial Gases – Americas segment and the Industrial Gases – EMEA segment.

Table of Contents

The following table summarizes the carrying amount of the accrual for cost reduction actions at 30 September 2017:

	Severance and Other Benefits	Asset Actions/Other	Total
2016 Charge	$ 34.5	$ —	$34.5
Amount reflected in pension liability	(.9)	—	(.9)
Cash expenditures	(21.6)	—	(21.6)
Currency translation adjustment	.3	—	.3
30 September 2016	$ 12.3	$ —	$12.3
2017 Charge	66.3	88.5	154.8
Noncash expenses	—	(84.2)	(84.2)
Amount reflected in pension liability	(2.0)	—	(2.0)
Amount reflected in other noncurrent liabilities	—	(2.2)	(2.2)
Cash expenditures	(35.7)	(1.2)	(36.9)
Currency translation adjustment	(.3)	—	(.3)
30 September 2017	$ 40.6	$ .9	$41.5

Business Realignment and Reorganization

On 18 September 2014, we announced plans to reorganize the Company, including realignment of our businesses in new reporting segments and other organizational changes, effective as of 1 October 2014. As a result of this reorganization, we incurred severance and other charges.

In fiscal year 2015, we recognized an expense of $180.1. Severance and other benefits totaled $131.5 and related to the elimination of approximately 1,700 positions. Asset and associated contract actions totaled $48.6 and related primarily to a plant shutdown in the Corporate and other segment and the exit of a product line within the Industrial Gases – Global segment. The 2015 charges related to the segments as follows: $31.7 in Industrial Gases – Americas, $52.2 in Industrial Gases – EMEA, $10.3 in Industrial Gases – Asia, $37.0 in Industrial Gases – Global, and $48.9 in Corporate and other.

During the fourth quarter of 2014, an expense of $11.1 was incurred relating to the elimination of approximately 40 positions.

The following table summarizes the carrying amount of the accrual for the business realignment and reorganization at 30 September 2017:

	Severance and Other Benefits	Asset Actions/Other	Total
2014 Charge	$ 11.1	$ —	$11.1
Cash expenditures	(1.7)	—	(1.7)
30 September 2014	$ 9.4	$ —	$9.4
2015 Charge	131.5	48.6	180.1
Amount reflected in pension liability	(11.2)	—	(11.2)
Noncash expenses	—	(40.2)	(40.2)
Cash expenditures	(100.3)	(1.2)	(101.5)
Currency translation adjustment	(.4)	—	(.4)
30 September 2015	$ 29.0	$ 7.2	$36.2
Cash expenditures	(28.6)	(3.8)	(32.4)
Currency translation adjustment	(.4)	—	(.4)
30 September 2016	$ —	$ 3.4	$3.4
Accrual settlement	—	(3.4)	(3.4)
30 September 2017	$ —	$ —	$—

Table of Contents

6. BUSINESS COMBINATION

On 30 December 2014, we acquired our partner's equity ownership interest in a liquefied atmospheric industrial gases production joint venture in North America for $22.6, which increased our ownership from 50% to 100%. The transaction was accounted for as a business combination, and subsequent to the acquisition, the results are consolidated within our Industrial Gases – Americas segment. The assets acquired, primarily plant and equipment, were recorded at their fair market values as of the acquisition date.

The acquisition date fair value of the previously held equity interest was determined using a discounted cash flow analysis under the income approach. The twelve months ended 30 September 2015 include a gain of $17.9 as a result of revaluing our previously held equity interest to fair value as of the acquisition date. This gain is reflected on the consolidated income statements as "Gain on previously held equity interest."

7. INVENTORIES

The components of inventories are as follows:

30 September	2017	2016
Finished goods	$120.0	$131.3
Work in process	15.7	18.3
Raw materials, supplies and other	223.0	117.1
Total FIFO Cost	358.7	266.7
Less: Excess of FIFO cost over LIFO cost	(23.3)	(11.7)
Inventories	$335.4	$255.0

Inventories valued using the LIFO method comprised 48.7% and 22.9% of consolidated inventories before LIFO adjustment at 30 September 2017 and 2016, respectively. Liquidation of LIFO inventory layers in 2017, 2016, and 2015 did not materially affect the results of operations.

FIFO cost approximates replacement cost.

8. SUMMARIZED FINANCIAL INFORMATION OF EQUITY AFFILIATES

The summarized financial information below is on a combined 100% basis and has been compiled based on financial statements of the companies accounted for by the equity method. The amounts presented include the accounts of the following equity affiliates:

Abdullah Hashim Industrial Gases & Equipment Co., Ltd. (25%);
Air Products South Africa (Proprietary) Limited (50%);
Bangkok Cogeneration Company Limited (49%);
Bangkok Industrial Gases Co., Ltd. (49%);
Chengdu Air & Gas Products Ltd. (50%);
Helios S.p.A. (49%);
High-Tech Gases (Beijing) Co., Ltd. (50%);
INFRA Group (40%);
INOX Air Products Limited (50%);
Jazan Gas Projects Company (25%);
Kulim Industrial Gases Sdn. Bhd. (50%);
Sapio Produzione Idrogeno Ossigeno S.r.l. (49%);
Tecnologia en Nitrogeno S. de R.L. de C.V. (50%);
Tyczka Industrie-Gases GmbH (50%);
WuXi Hi-Tech Gas Co., Ltd. (50%);
and principally, other industrial gas producers.

Table of Contents

30 September	2017	2016
Current assets	$1,333.2	$1,436.7
Noncurrent assets	4,026.9	3,063.3
Current liabilities	666.8	694.8
Noncurrent liabilities	2,194.3	1,540.4

Year Ended 30 September	2017	2016	2015
Net sales	$2,343.3	$2,271.6	$2,460.5
Sales less cost of sales	878.6	871.5	922.7
Operating income	509.5	482.1	512.4
Net income	343.5	334.1	343.5

The increase in noncurrent assets and noncurrent liabilities is primarily related to Jazan Gas Projects Company.
Dividends received from equity affiliates were $99.5, $95.9, and $50.5 in 2017, 2016, and 2015, respectively.
The investment in net assets of and advances to equity affiliates as of 30 September 2017 and 2016 included investment in foreign affiliates of $1,285.1 and $1,281.5, respectively.
As of 30 September 2017 and 2016, the amount of investment in companies accounted for by the equity method included equity method goodwill in the amount of $45.8 and $109.5, respectively. The decrease was primarily driven by an other-than-temporary impairment of our investment in an equity affiliate in Saudi Arabia discussed below.

Equity Affiliate Impairment Charge

During the third quarter of fiscal year 2017, Abdullah Hashim Industrial Gases & Equipment Co., Ltd. (AHG), a 25% owned equity affiliate in our Industrial Gases – EMEA segment, completed a review of its business plan and outlook. As a result of the revised business plan, we determined there was an other-than-temporary impairment of our investment in AHG and, therefore, recorded a noncash impairment charge of $79.5 to reduce the carrying value of our investment. This charge is reflected on our consolidated income statements within “Equity affiliates' income” and was not deductible for tax purposes. This charge has been excluded from segment results.
The decline in value results from expectations for lower future cash flows to be generated by AHG, primarily due to challenging economic conditions in Saudi Arabia, including the impacts of lower prices in the oil and gas industry, increased competition, and capital project growth opportunities not materializing as anticipated. The AHG investment was valued based on the results of the income and market valuation approaches.
The income approach utilized a discount rate based on a market-participant, risk-adjusted weighted average cost of capital, which considers industry required rates of return on debt and equity capital for a target industry capital structure adjusted for risks associated with size and geography. Other significant estimates and assumptions that drive our updated valuation of AHG include revenue growth rates and profit margins that were lower than those upon acquisition and our assessment of AHG's business improvement plan effectiveness.
Under the market approach, we estimated fair value based on market multiples of revenue and earnings derived from publicly-traded industrial gases companies engaged in similar lines of business, adjusted to reflect differences in size and growth prospects.
As of 30 September 2017, the carrying value of our investment in AHG is $66.7 and is reflected in our Industrial Gases – EMEA segment. The investment is reported in “Investment in net assets of and advances to equity affiliates” on our consolidated balance sheets.
There have been no other significant changes to our investments in equity affiliates during fiscal year 2017.

Jazan

On 19 April 2015, a joint venture between Air Products and ACWA Holding entered into a 20-year oxygen and nitrogen supply agreement to supply Saudi Aramco’s oil refinery and power plant being built in Jazan, Saudi Arabia. Air Products owns 25% of the joint venture and guarantees the repayment of its share of an equity bridge loan. ACWA also guarantees their share of the loan. We determined that the joint venture is a variable interest entity, for which we are not the primary beneficiary.

Table of Contents

As of 30 September 2017 and 2016, other noncurrent liabilities included $94.4 for our obligation to make future equity contributions based on our proportionate share of the advances received by the joint venture under the loan. During fiscal year 2016 and 2015, we recorded noncash transactions that resulted in an increase of $26.9 and $67.5, respectively, to our investment in net assets of and advances to equity affiliates. These noncash transactions have been excluded from the consolidated statement of cash flows. In total, we expect to invest approximately $100 in this joint venture. There has been no change to our investment during fiscal year 2017.
Air Products has a long-term sale of equipment contract with the joint venture to engineer, procure, and construct the industrial gas facilities that will supply the gases to Saudi Aramco. Sales related to this contract are included in the results of our Industrial Gases – Global segment and were approximately $540 and $300 during fiscal year 2017 and 2016, respectively. Sales related to this contract were not material during fiscal year 2015.

9. PLANT AND EQUIPMENT, NET

The major classes of plant and equipment are as follows:

30 September	Useful Life in years	2017	2016
Land		$231.0	$202.9
Buildings	30	977.8	918.6
Production facilities[(A)]	10 to 20	13,577.1	12,391.9
Distribution and other machinery and equipment[(B)]	5 to 25	3,944.0	3,821.0
Construction in progress		817.9	1,325.8
Plant and equipment, at cost		19,547.8	18,660.2
Less: accumulated depreciation		11,107.6	10,400.5
Plant and equipment, net		$8,440.2	$8,259.7

(A) Depreciable lives of production facilities related to long-term customer supply contracts are matched to the contract lives.

(B) The depreciable lives for various types of distribution equipment are 10 to 25 years for cylinders, depending on the nature and properties of the product; 20 years for tanks; 7.5 years for customer stations; and 5 to 15 years for tractors and trailers.

Depreciation expense was $843.2, $832.3, and $834.5 in 2017, 2016, and 2015, respectively.

Table of Contents

10. GOODWILL

Changes to the carrying amount of consolidated goodwill by segment are as follows:

	Industrial Gases– Americas	Industrial Gases– EMEA	Industrial Gases– Asia	Industrial Gases– Global	Total
Goodwill, net at 30 September 2015	$ 297.6	$ 386.5	$ 133.1	$ 19.9	$ 837.1
Currency translation	11.5	(5.9)	2.1	.3	8.0
Goodwill, net at 30 September 2016	$ 309.1	$ 380.6	$ 135.2	$ 20.2	$ 845.1
Impairment loss	(145.3)	—	—	—	(145.3)
Acquisitions	—	3.5	—	—	3.5
Currency translation	(.1)	18.3	—	—	18.2
Goodwill, net at 30 September 2017	$ 163.7	$ 402.4	$ 135.2	$ 20.2	$ 721.5

30 September	2017	2016	2015
Goodwill, gross	$ 1,138.7	$ 1,103.7	$ 1,080.8
Accumulated impairment losses	(417.2)	(258.6)	(243.7)
Goodwill, net	$ 721.5	$ 845.1	$ 837.1

We review goodwill for impairment annually in the fourth quarter of the fiscal year and whenever events or changes in circumstances indicate that the carrying value of goodwill might not be recoverable. As described in Note 2, New Accounting Guidance, we elected to early adopt new accounting guidance that simplifies the test for goodwill impairment during the third quarter of fiscal year 2017.

For the first nine months of fiscal year 2017, volumes declined in our Latin America reporting unit (LASA), and overall revenue growth did not meet expectations. Due to weak economic conditions in Latin America and expectations for continued volume weakness in the Latin American countries and markets in which we operate, we lowered our long-term growth projections. We conducted an interim impairment test of the goodwill associated with LASA within the Industrial Gases – Americas segment as of 30 June 2017. As a result, we recorded a noncash goodwill impairment charge of $145.3, which has been reflected on our consolidated income statements within "Goodwill and intangible asset impairment charge." This charge was not deductible for tax purposes and has been excluded from segment operating income.

LASA includes assets and goodwill associated with operations in Chile and other Latin American countries. We estimated the fair value of LASA based on two valuation approaches, the income approach and the market approach. We reviewed relevant facts and circumstances in determining the weighting of the approaches.

Under the income approach, we estimated the fair value of LASA based on the present value of estimated future cash flows. Cash flow projections were based on management's estimates of revenue growth rates and EBITDA margins, taking into consideration business and market conditions for the Latin American countries and markets in which we operate. We calculated the discount rate based on a market-participant, risk-adjusted weighted average cost of capital, which considers industry specific rates of return on debt and equity capital for a target industry capital structure, adjusted for risks associated with business size and geography.

Under the market approach, we estimated fair value based on market multiples of revenue and earnings derived from publicly-traded industrial gases companies and regional manufacturing companies, adjusted to reflect differences in size and growth prospects.

Management judgment is required in the determination of each assumption utilized in the valuation model, and actual results could differ from our estimates.

The accumulated impairment losses of $417.2 as of 30 September 2017 are attributable to LASA within the Industrial Gases– Americas segment and include the LASA impairment charge recorded in fiscal year 2014 as well as the impacts of currency translation on the losses.

Prior to completing the LASA goodwill impairment test, we tested the recoverability of LASA's long-lived assets and other indefinite-lived intangible assets. Refer to Note 11, Intangible Assets, for additional information.

During the fourth quarter of 2017, we conducted our annual goodwill impairment test. We determined that the fair value of all our reporting units exceeded their carrying value except LASA, for which the fair value equaled the

carrying value.

Table of Contents

11. INTANGIBLE ASSETS

The table below provides details of acquired intangible assets:

	30 September 2017			30 September 2016		
	Gross	Accumulated Amortization/ Impairment	Net	Gross	Accumulated Amortization/ Impairment	Net
Customer relationships	$424.1	$ (142.3)	$281.8	$400.6	$ (118.2)	$282.4
Patents and technology	13.4	(10.6)	2.8	13.6	(10.1)	3.5
Other	73.4	(36.6)	36.8	73.0	(33.7)	39.3
Total finite-lived intangibles	510.9	(189.5)	321.4	487.2	(162.0)	325.2
Trade names and trademarks, indefinite-lived	67.8	(20.9)	46.9	66.2	(3.5)	62.7
Total Intangible Assets	$578.7	$ (210.4)	$368.3	$553.4	$ (165.5)	$387.9

The decrease in net intangible assets from 2016 to 2017 is primarily due to amortization and an impairment charge recorded during the third quarter of fiscal year 2017. Amortization expense for intangible assets was $22.6, $22.3, and $24.0 in 2017, 2016, and 2015, respectively. Refer to Note 1, Major Accounting Policies, for amortization periods associated with our intangible assets.

Indefinite-lived intangible assets are subject to impairment testing at least annually or more frequently if events or changes in circumstances indicate that potential impairment exists. The impairment test for indefinite-lived intangible assets involves calculating the fair value of the indefinite-lived intangible assets and comparing the fair value to their carrying value. If the fair value is less than the carrying value, the difference is recorded as an impairment loss.

As discussed in Note 10, Goodwill, in response to weak Latin America economic conditions and expectations for continued volume weakness in the Latin American countries and markets in which we operate, we lowered our long-term growth projections. An interim impairment test of indefinite-lived intangibles associated with LASA was conducted as of 30 June 2017 utilizing the royalty savings method, a form of the income approach. We determined that the carrying value of trade names and trademarks was in excess of fair value, and as a result, we recorded a noncash impairment charge of $16.8 to reduce these indefinite-lived intangible assets to their fair value. This charge is reflected within “Goodwill and intangible asset impairment charge” on our consolidated income statements. These trade names and trademarks are included in our Industrial Gases – Americas segment. This charge has been excluded from segment operating income. We tested the recoverability of LASA long-lived assets, including finite-lived intangible assets subject to amortization, and concluded that they were recoverable from expected future undiscounted cash flows.

In the fourth quarter of 2017, we conducted our annual impairment test of indefinite-lived intangibles and found no indications of impairment.

Projected annual amortization expense for intangible assets as of 30 September 2017 is as follows:

2018	$22.1
2019	21.8
2020	21.6
2021	20.1
2022	17.4
Thereafter	218.4
Total	$321.4

Table of Contents

12. LEASES

Lessee Accounting

Capital leases, primarily for the right to use machinery and equipment, are included with owned plant and equipment on the consolidated balance sheet in the amount of $22.3 and $22.4 at 30 September 2017 and 2016, respectively. Related amounts of accumulated depreciation are $5.3 and $4.5, respectively.

Operating leases principally relate to real estate and also include aircraft, distribution equipment, and vehicles. Certain leases include escalation clauses, renewal, and/or purchase options. Rent expense is recognized on a straight-line basis over the minimum lease term. Rent expense under operating leases, including month-to-month agreements, was $65.8 in 2017, $67.6 in 2016, and $70.4 in 2015.

At 30 September 2017, minimum payments due under leases associated with continuing operations are as follows:

	Capital Leases	Operating Leases
2018	$ 2.2	$ 56.6
2019	1.8	45.8
2020	1.6	35.2
2021	3.0	27.1
2022	1.5	22.9
Thereafter	19.9	126.6
Total	$ 30.0	$ 314.2

The present value of the above future capital lease payments totaled $10.8. Refer to Note 15, Debt.

Included in the operating lease payments disclosed above are future minimum payments due under leases related to the Energy-from-Waste discontinued operations (i.e., Tees Valley, United Kingdom) of approximately $2 in each of the next five years and $40 thereafter, for a total lease commitment of approximately $50. As discussed in Note 3, Discontinued Operations, during the first quarter of 2017, we recorded an accrual for these lease obligations to other noncurrent liabilities in continuing operations.

Lessor Accounting

As discussed under Revenue Recognition in Note 1, Major Accounting Policies, certain contracts associated with facilities that are built to provide product to a specific customer are required to be accounted for as leases. Lease receivables, net, are primarily included in noncurrent capital lease receivables on our consolidated balance sheets, with the remaining balance in other receivables and current assets.

The components of lease receivables were as follows:

30 September	2017	2016
Gross minimum lease payments receivable	$1,897.0	$2,072.6
Unearned interest income	(671.9)	(762.7)
Lease Receivables, net	$1,225.1	$1,309.9

Lease payments collected in 2017, 2016, and 2015 were $183.6, $186.0, and $146.6, respectively. These payments reduced the lease receivable balance by $92.2, $85.5, and $68.8 in 2017, 2016, and 2015, respectively.

At 30 September 2017, minimum lease payments expected to be collected are as follows:

2018	$182.0
2019	176.4
2020	171.4
2021	165.5
2022	154.1
Thereafter	1,047.6
Total	$1,897.0

Table of Contents

13. FINANCIAL INSTRUMENTS

Currency Price Risk Management

Our earnings, cash flows, and financial position are exposed to foreign currency risk from foreign currency-denominated transactions and net investments in foreign operations. It is our policy to minimize our cash flow volatility from changes in currency exchange rates. This is accomplished by identifying and evaluating the risk that our cash flows will change in value due to changes in exchange rates and by executing the appropriate strategies necessary to manage such exposures. Our objective is to maintain economically balanced currency risk management strategies that provide adequate downside protection.

Forward Exchange Contracts

We enter into forward exchange contracts to reduce the cash flow exposure to foreign currency fluctuations associated with highly anticipated cash flows and certain firm commitments, such as the purchase of plant and equipment. We also enter into forward exchange contracts to hedge the cash flow exposure on intercompany loans. This portfolio of forward exchange contracts consists primarily of Euros and U.S. Dollars. The maximum remaining term of any forward exchange contract currently outstanding and designated as a cash flow hedge at 30 September 2017 is 1.8 years.

Forward exchange contracts are also used to hedge the value of investments in certain foreign subsidiaries and affiliates by creating a liability in a currency in which we have a net equity position. The primary currency pair in this portfolio of forward exchange contracts is Euros and U.S. Dollars.

In addition to the forward exchange contracts that are designated as hedges, we utilize forward exchange contracts that are not designated as hedges. These contracts are used to economically hedge foreign currency-denominated monetary assets and liabilities, primarily working capital. The primary objective of these forward exchange contracts is to protect the value of foreign currency-denominated monetary assets and liabilities from the effects of volatility in foreign exchange rates that might occur prior to their receipt or settlement. This portfolio of forward exchange contracts consists of many different foreign currency pairs, with a profile that changes from time to time depending on business activity and sourcing decisions.

The table below summarizes our outstanding currency price risk management instruments:

	30 September 2017		30 September 2016	
	US$ Notional	Years Average Maturity	US$ Notional	Years Average Maturity
Forward Exchange Contracts				
Cash flow hedges	$3,150.2	.4	$4,130.3	.5
Net investment hedges	675.5	3.0	968.2	2.7
Not designated	273.8	.1	2,648.3	.4
Total Forward Exchange Contracts	$4,099.5	.8	$7,746.8	.7

The notional value of forward exchange contracts not designated in the table above includes forward contracts which were hedging intercompany loans that were repaid prior to their original maturity dates in anticipation of the spin-off of Versum. The forward exchange contracts no longer qualified as cash flow hedges due to the early repayment of the loans. We entered into additional forward exchange contracts to offset these outstanding positions to eliminate any future earnings impact. The decrease in notional value from 30 September 2016 to 30 September 2017 is primarily due to the maturity of the aforementioned intercompany loan hedges and their offsetting positions.

In addition to the above, we use foreign currency-denominated debt to hedge the foreign currency exposures of our net investment in certain foreign subsidiaries. The designated foreign currency-denominated debt and related accrued interest included €912.2 million ($1,077.7) at 30 September 2017 and €920.7 million ($1,034.4) at 30 September 2016. The designated foreign currency-denominated debt is located on the balance sheet in the long-term debt line item.

Debt Portfolio Management

It is our policy to identify on a continuing basis the need for debt capital and evaluate the financial risks inherent in funding the Company with debt capital. Reflecting the result of this ongoing review, the debt portfolio and hedging program are managed with the objectives and intent to (1) reduce funding risk with respect to borrowings made by us to preserve our access to debt capital and provide debt capital as required for funding and liquidity purposes, and (2) manage the aggregate interest rate risk and the debt portfolio in accordance with certain debt management parameters.

Interest Rate Management Contracts

We enter into interest rate swaps to change the fixed/variable interest rate mix of our debt portfolio in order to maintain the percentage of fixed- and variable-rate debt within the parameters set by management. In accordance with these parameters, the agreements are used to manage interest rate risks and costs inherent in our debt portfolio. Our interest rate management portfolio generally consists of fixed-to-floating interest rate swaps (which are designated as fair value hedges), pre-issuance interest rate swaps and treasury locks (which hedge the interest rate risk associated with anticipated fixed-rate debt issuances and are designated as cash flow hedges), and floating-to-fixed interest rate swaps (which are designated as cash flow hedges). At 30 September 2017, the outstanding interest rate swaps were denominated in U.S. Dollars. The notional amount of the interest rate swap agreements is equal to or less than the designated debt being hedged. When interest rate swaps are used to hedge variable-rate debt, the indices of the swaps and the debt to which they are designated are the same. It is our policy not to enter into any interest rate management contracts which lever a move in interest rates on a greater than one-to-one basis.

Cross Currency Interest Rate Swap Contracts

We enter into cross currency interest rate swap contracts when our risk management function deems necessary. These contracts may entail both the exchange of fixed- and floating-rate interest payments periodically over the life of the agreement and the exchange of one currency for another currency at inception and at a specified future date. The contracts are used to hedge either certain net investments in foreign operations or nonfunctional currency cash flows related to intercompany loans. The current cross currency interest rate swap portfolio consists of fixed-to-fixed swaps primarily between U.S. Dollars and offshore Chinese Renminbi, U.S. Dollars and Chilean Pesos, and U.S. Dollars and British Pound Sterling.

The following table summarizes our outstanding interest rate management contracts and cross currency interest rate swaps:

	30 September 2017				30 September 2016			
	US$ Notional	Average Pay %	Average Receive %	Years Average Maturity	US$ Notional	Average Pay %	Average Receive %	Years Average Maturity
Interest rate swaps (fair value hedge)	$600.0	LIBOR	2.28%	1.3	$600.0	LIBOR	2.28%	2.3
Cross currency interest rate swaps (net investment hedge)	$539.7	3.27%	2.59%	1.9	$517.7	3.24%	2.43%	2.6
Cross currency interest rate swaps (cash flow hedge)	$1,095.7	4.96%	2.78%	2.4	$1,088.9	4.77%	2.72%	3.3
Cross currency interest rate swaps (not designated)	$41.6	3.28%	2.32%	1.7	$27.4	3.62%	.81%	1.8

Table of Contents

The table below summarizes the fair value and balance sheet location of our outstanding derivatives:

	Balance Sheet	30 September		Balance Sheet	30 September	
	Location	2017	2016	Location	2017	2016
Derivatives Designated as Hedging Instruments:						
Forward exchange contracts	Other receivables	$81.7	$72.3	Accrued liabilities	$82.0	$44.0
Interest rate management contracts	Other receivables	11.1	19.9	Accrued liabilities	10.7	—
Forward exchange contracts	Other noncurrent assets	27.1	44.4	Other noncurrent liabilities	13.8	9.1
Interest rate management contracts	Other noncurrent assets	102.6	160.0	Other noncurrent liabilities	22.2	12.0
Total Derivatives Designated as Hedging Instruments		$222.5	$296.6		$128.7	$65.1
Derivatives Not Designated as Hedging Instruments:						
Forward exchange contracts	Other receivables	1.1	77.1	Accrued liabilities	$2.2	$29.5
Interest rate management contracts	Other receivables	—	—	Accrued liabilities	1.0	—
Interest rate management contracts	Other noncurrent assets	4.2	—	Other noncurrent liabilities	—	.7
Total Derivatives Not Designated as Hedging Instruments		$5.3	$77.1		$3.2	$30.2
Total Derivatives		$227.8	$373.7		$131.9	$95.3

Refer to Note 14, Fair Value Measurements, which defines fair value, describes the method for measuring fair value, and provides additional disclosures regarding fair value measurements.

Table of Contents

The table below summarizes the gain or loss related to our cash flow hedges, fair value hedges, net investment hedges, and derivatives not designated as hedging instruments:

	Year Ended 30 September							
	Forward Exchange Contracts		Foreign Currency Debt		Other[(A)]		Total	
	2017	2016	2017	2016	2017	2016	2017	2016
Cash Flow Hedges, net of tax:								
Net gain (loss) recognized in OCI (effective portion)	$.3	$10.5	$—	$—	$(12.9)	$3.2	$(12.6)	$13.7
Net (gain) loss reclassified from OCI to sales/cost of sales (effective portion)	18.3	.2	—	—	—	—	18.3	.2
Net (gain) loss reclassified from OCI to other income (expense), net (effective portion)	(3.8)	(25.7)	—	—	10.5	(20.3)	6.7	(46.0)
Net (gain) loss reclassified from OCI to interest expense (effective portion)	(2.1)	6.7	—	—	2.9	3.3	.8	10.0
Net (gain) loss reclassified from OCI to other income (expense), net (ineffective portion)	(1.6)	(.2)	—	—	—	—	(1.6)	(.2)
Fair Value Hedges:								
Net gain (loss) recognized in interest expense[(B)]	$—	$—	$—	$—	$(14.7)	$(8.8)	$(14.7)	$(8.8)
Net Investment Hedges, net of tax:								
Net gain (loss) recognized in OCI	$(11.1)	$17.4	$(32.8)	$(9.6)	$(15.6)	$35.0	$(59.5)	$42.8
Derivatives Not Designated as Hedging Instruments:								
Net gain (loss) recognized in other income (expense), net[(C)]	$4.1	$(1.8)	$—	$—	$(2.4)	$(1.6)	$1.7	$(3.4)

(A) Other includes the impact on other comprehensive income (OCI) and earnings primarily related to interest rate and cross currency interest rate swaps.

(B) The impact of fair value hedges noted above was largely offset by recognized gains and losses resulting from the impact of changes in related interest rates on outstanding debt.

(C) The impact of the non-designated hedges noted above was largely offset by recognized gains and losses resulting from the impact of changes in exchange rates on assets and liabilities denominated in nonfunctional currencies.

The amount of cash flow hedges' unrealized gains and losses at 30 September 2017 that are expected to be reclassified to earnings in the next twelve months is not material.

The cash flows related to all derivative contracts are reported in the operating activities section of the consolidated statements of cash flows.

Credit Risk-Related Contingent Features

Certain derivative instruments are executed under agreements that require us to maintain a minimum credit rating with both Standard & Poor's and Moody's. If our credit rating falls below this threshold, the counterparty to the derivative instruments has the right to request full collateralization on the derivatives' net liability position. The net liability position of derivatives with credit risk-related contingent features was $34.6 as of 30 September 2017 and $11.2 as of 30 September 2016. Because our current credit rating is above the various pre-established thresholds, no collateral has been posted on these liability positions.

Table of Contents

Counterparty Credit Risk Management

We execute financial derivative transactions with counterparties that are highly rated financial institutions, all of which are investment grade at this time. Some of our underlying derivative agreements give us the right to require the institution to post collateral if its credit rating falls below the pre-established thresholds with Standard & Poor's or Moody's. The collateral that the counterparties would be required to post was $138.5 as of 30 September 2017 and $267.6 as of 30 September 2016. No financial institution is required to post collateral at this time, as all have credit ratings at or above the threshold.

14. FAIR VALUE MEASUREMENTS

Fair value is defined as an exit price, i.e., the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The fair value hierarchy prioritizes the inputs to valuation techniques used to measure fair value into three broad levels as follows:

Level 1— Quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2— Inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the asset or liability.

Level 3— Inputs that are unobservable for the asset or liability based on our own assumptions (about the assumptions market participants would use in pricing the asset or liability).

The methods and assumptions used to measure the fair value of financial instruments are as follows:

Short-term Investments

Short-term investments include time deposits with original maturities greater than three months and less than one year. The estimated fair value of the short-term investments, which approximates carrying value as of 30 September 2017 and 2016, was determined using level 2 inputs within the fair value hierarchy. Level 2 measurements were based on current interest rates for similar investments with comparable credit risk and time to maturity.

Derivatives

The fair value of our interest rate management contracts and forward exchange contracts are quantified using the income approach and are based on estimates using standard pricing models. These models take into account the value of future cash flows as of the balance sheet date, discounted to a present value using discount factors that match both the time to maturity and currency of the underlying instruments. The computation of the fair values of these instruments is generally performed by the Company. These standard pricing models utilize inputs which are derived from or corroborated by observable market data such as interest rate yield curves as well as currency spot and forward rates. Therefore, the fair value of our derivatives is classified as a level 2 measurement. On an ongoing basis, we randomly test a subset of our valuations against valuations received from the transaction's counterparty to validate the accuracy of our standard pricing models. Counterparties to these derivative contracts are highly rated financial institutions.

Refer to Note 13, Financial Instruments, for a description of derivative instruments, including details on the balance sheet line classifications.

Long-term Debt

The fair value of our debt is based on estimates using standard pricing models that take into account the value of future cash flows as of the balance sheet date, discounted to a present value using discount factors that match both the time to maturity and currency of the underlying instruments. These standard valuation models utilize observable market data such as interest rate yield curves and currency spot rates. Therefore, the fair value of our debt is classified as a level 2 measurement. We generally perform the computation of the fair value of these instruments.

Table of Contents

The carrying values and fair values of financial instruments were as follows:

	30 September 2017		30 September 2016	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Assets				
Derivatives				
Forward exchange contracts	$109.9	$ 109.9	$193.8	$ 193.8
Interest rate management contracts	117.9	117.9	179.9	179.9
Liabilities				
Derivatives				
Forward exchange contracts	$98.0	$ 98.0	$82.6	$ 82.6
Interest rate management contracts	33.9	33.9	12.7	12.7
Long-term debt, including current portion	3,818.8	3,928.2	4,275.1	4,474.0

The carrying amounts reported in the balance sheet for cash and cash items, short-term investments, trade receivables, payables and accrued liabilities, accrued income taxes, and short-term borrowings approximate fair value due to the short-term nature of these instruments. Accordingly, these items have been excluded from the above table.

The following table summarizes assets and liabilities measured at fair value on a recurring basis in the consolidated balance sheets:

	30 September 2017				30 September 2016			
	Total	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3
Assets at Fair Value								
Derivatives								
Forward exchange contracts	$109.9	$ —	$109.9	$ —	$193.8	$ —	$193.8	$ —
Interest rate management contracts	117.9	—	117.9	—	179.9	—	179.9	—
Total Assets at Fair Value	$227.8	$ —	$227.8	$ —	$373.7	$ —	$373.7	$ —
Liabilities at Fair Value								
Derivatives								
Forward exchange contracts	$98.0	$ —	$98.0	$ —	$82.6	$ —	$82.6	$ —
Interest rate management contracts	33.9	—	33.9	—	12.7	—	12.7	—
Total Liabilities at Fair Value	$131.9	$ —	$131.9	$ —	$95.3	$ —	$95.3	$ —

Table of Contents

The following is a tabular presentation of nonrecurring fair value measurements along with the level within the fair value hierarchy in which the fair value measurement in its entirety falls:

	31 December 2016					
	Total	Level 1	Level 2	Level 3	2017 Loss	2016 Loss
Plant and Equipment – Continuing operations[(A)]	$1.4	$ —	$ —	$ 1.4	$45.7	$—
Plant and Equipment—Discontinued operations[(A)]	$11.0	$ —	$ —	$ 11.0	$6.3	$913.5

(A) We assessed the recoverability of the carrying value of assets associated with the EfW discontinued operation, including the air separation unit within continuing operations of our Industrial Gases – EMEA segment. We based our estimates primarily on an orderly liquidation valuation which resulted in losses for the difference between the orderly liquidation value and net book value of the assets as of 31 December 2016 during fiscal year 2017. There have been no significant updates to our estimates as of 30 September 2017. For additional information, see Note 3, Discontinued Operations, and Note 5, Business Restructuring and Cost Reduction Actions.

	30 June 2017				2017
	Total	Level 1	Level 2	Level 3	Loss
Investment in Equity Affiliate[(A)]	$68.5	$ —	$ —	$ 68.5	$79.5

(A) We assessed the recoverability of the carrying value of our equity investment in AHG. We estimated the fair value of our investment using weighting of the results of the income and market approaches. An impairment loss was recognized for the difference between the carrying amount and the fair value of the investment as of 30 June 2017. There have been no updates to our estimates as of 30 September 2017. For additional information, see Note 8, Summarized Financial Information of Equity Affiliates.

During the third quarter ended 30 June 2017, we recognized a goodwill impairment charge of $145.3 and an intangible asset impairment charge of $16.8 associated with our LASA reporting unit. Refer to Note 10, Goodwill, and Note 11, Intangible Assets, for more information related to these charges and the associated fair value measurement methods and significant inputs/assumptions, which were classified as Level 3 since unobservable inputs were utilized in the fair value measurements.

15. DEBT

The tables below summarize our outstanding debt at 30 September 2017 and 2016:

Total Debt

30 September	2017	2016
Short-term borrowings	$144.0	$935.8
Current portion of long-term debt	416.4	365.4
Long-term debt	3,402.4	3,909.7
Total Debt	$3,962.8	$5,210.9

Short-term Borrowings

30 September	2017	2016
Bank obligations	$144.0	$133.1
Commercial paper	—	802.7
Total Short-term Borrowings	$144.0	$935.8

The weighted average interest rate of short-term borrowings outstanding at 30 September 2017 and 2016 was 4.6% and 1.1%, respectively.

Cash paid for interest, net of amounts capitalized, was $125.9 in 2017, $120.6 in 2016, and $96.8 in 2015.

Table of Contents

Long-term Debt

30 September	Fiscal Year Maturities	2017	2016
Payable in U.S. Dollars			
Debentures			
8.75%	2021	$18.4	$18.4
Medium-term Notes (weighted average rate)			
Series E 7.6%	2026	17.2	17.2
Senior Notes			
Note 1.2%	2018	400.0	400.0
Note 4.375%	2019	400.0	400.0
Note 3.0%	2022	400.0	400.0
Note 2.75%	2023	400.0	400.0
Note 3.35%	2024	400.0	400.0
Other (weighted average rate)			
Variable-rate industrial revenue bonds .87%	2035 to 2050	631.9	769.9
Other .89%	2018 to 2019	10.9	25.7
Payable in Other Currencies			
Eurobonds 4.625%	2017	—	337.0
Eurobonds 2.0%	2020	354.4	337.0
Eurobonds 1.0%	2025	354.4	337.0
Eurobonds .375%	2021	413.5	393.2
Other 4.3%	2018 to 2022	25.8	52.9
Capital Lease Obligations			
United States 5.0%	2018	.2	.5
Foreign 10.7%	2018 to 2036	10.6	9.7
Total Principal Amount		3,837.3	4,298.5
Less: Unamortized Discount and Debt Issuance Costs		(18.5)	(23.4)
Total Long-term Debt		3,818.8	4,275.1
Less: Current portion of long-term debt		(416.4)	(365.4)
Long-term Debt		$3,402.4	$3,909.7

Maturities of long-term debt in each of the next five years and beyond are as follows:

2018	$416.4
2019	409.0
2020	356.1
2021	433.3
2022	401.0
Thereafter	1,821.5
Total	$3,837.3

Various debt agreements to which we are a party include financial covenants and other restrictions, including restrictions pertaining to the ability to create property liens and enter into certain sale and leaseback transactions. As of 30 September 2017, we are in compliance with all the financial and other covenants under our debt agreements.
Additional commitments totaling $23.4 are maintained by our foreign subsidiaries, all of which were borrowed and outstanding at 30 September 2017.

Table of Contents

2017 Credit Agreement

On 31 March 2017, we entered into a five-year $2,500.0 revolving credit agreement with a syndicate of banks (the "2017 Credit Agreement"), under which senior unsecured debt is available to both the Company and certain of its subsidiaries. The 2017 Credit Agreement provides a source of liquidity for the Company and supports its commercial paper program. The Company's only financial covenant is a maximum ratio of total debt to total capitalization (total debt plus total equity) no greater than 70%. No borrowings were outstanding under the 2017 Credit Agreement as of 30 September 2017.

The 2017 Credit Agreement terminates and replaces our previous $2,690.0 revolving credit agreement (the "2013 Credit Agreement"), which was to mature 30 April 2018. No borrowings were outstanding under the previous agreement at the time of its termination, and no early termination penalties were incurred.

Loss on Extinguishment of Debt

In September 2016, we exchanged notes issued to us by Versum in anticipation of the spin-off. The exchange resulted in a loss of $6.9. Refer to Note 4, Materials Technologies Separation, for additional information. In September 2015, we made a payment of $146.6 to redeem 3,000,000 Unidades de Fomento ("UF") Series E 6.30% Bonds due 22 January 2030 that had a carrying value of $130.0 and resulted in a net loss of $16.6. The fiscal year 2016 and 2015 losses are reflected on the consolidated income statements as "Loss on extinguishment of debt."

16. RETIREMENT BENEFITS

The Company and certain of its subsidiaries sponsor defined benefit pension plans and defined contribution plans that cover a substantial portion of its worldwide employees. The principal defined benefit pension plans are the U.S. salaried pension plan and the U.K. pension plan. These plans were closed to new participants in 2005 and were replaced with defined contribution plans. The principal defined contribution plan is the Retirement Savings Plan, in which a substantial portion of the U.S. employees participate; a similar plan is offered to U.K. employees. We also provide other postretirement benefits consisting primarily of healthcare benefits to U.S. retirees who meet age and service requirements.

Defined Benefit Pension Plans

Pension benefits earned are generally based on years of service and compensation during active employment. The cost of our defined benefit pension plans included the following components:

	2017		2016		2015	
	U.S.	International	U.S.	International	U.S.	International
Service cost	$29.0	$ 25.9	$36.5	$ 24.3	$42.2	$ 31.3
Interest cost	107.5	32.2	110.7	44.3	124.7	57.8
Expected return on plan assets	(207.7)	(75.2)	(202.0)	(78.3)	(202.0)	(79.8)
Amortization						
Net actuarial loss	88.7	54.7	85.3	35.6	78.9	41.4
Prior service cost	2.3	(.1)	2.8	(.2)	2.8	—
Settlements	10.5	1.7	5.1	1.3	18.9	2.3
Curtailments	4.3	(1.3)	—	(1.1)	5.3	—
Special termination benefits	2.8	.4	2.0	—	7.2	1.5
Other	—	1.1	(.3)	2.1	1.0	2.1
Net Periodic Benefit Cost – Total	$37.4	$ 39.4	$40.1	$ 28.0	$79.0	$ 56.6
Less: Discontinued Operations	(.7)	(4.1)	(7.9)	(4.4)	(12.9)	(7.7)
Net Periodic Benefit Cost – Continuing Operations	$36.7	$ 35.3	$32.2	$ 23.6	$66.1	$ 48.9

Table of Contents

Net periodic benefit cost is primarily included in cost of sales, selling and administrative expense, and pension settlement loss on our consolidated income statements. The amount of net periodic benefit cost capitalized in 2017, 2016, and 2015 was not material.

Certain of our pension plans provide for a lump sum benefit payment option at the time of retirement, or for corporate officers, six months after their retirement date. A participant's vested benefit is considered settled upon cash payment of the lump sum. We recognize pension settlement losses when cash payments exceed the sum of the service and interest cost components of net periodic benefit cost of the plan for the fiscal year. In 2017, 2016, and 2015, we recognized pension settlement losses of $10.5, $5.1 and $19.3 in results from continuing operations, respectively, to accelerate recognition of a portion of actuarial losses deferred in accumulated other comprehensive loss, primarily associated with the U.S. Supplementary Pension Plan. Special termination benefits are primarily related to the business restructuring and cost reduction actions initiated in their respective years.

In connection with the disposition of the two divisions comprising the former Materials Technologies segment, we incurred settlement, curtailment, and special termination benefits totaling $6.0 for the year ended 30 September 2017, of which $2.5 was reflected in "Business separation costs" and $3.5 was reflected in the results of discontinued operations on the consolidated income statements.

We calculate net periodic benefit cost for a given fiscal year based on assumptions developed at the end of the previous fiscal year. The following table sets forth the weighted average assumptions used in the calculation of net periodic benefit cost:

	2017		2016		2015	
	U.S.	International	U.S.	International	U.S.	International
Discount rate[(A)]	3.5 %	2.0 %	4.3 %	3.3 %	4.3 %	3.6 %
Expected return on plan assets	8.0 %	6.1 %	8.0 %	6.3 %	8.3 %	6.1 %
Rate of compensation increase	3.5 %	3.5 %	3.5 %	3.5 %	3.5 %	3.6 %

(A) Effective in 2016, the Company began to measure the service cost and interest cost components of pension expense by applying spot rates along the yield curve to the relevant projected cash flows, as we believe this provides a better measurement of these costs. The Company accounted for this in 2016 as a change in accounting estimate and, accordingly, accounted for it on a prospective basis. This change did not affect the measurement of the total benefit obligation. The 2017 discount rates used to measure the service cost and interest cost of our U.S. pension plans were 3.6% and 3.0%, respectively. The rates used to measure the service cost and interest cost of our major International pension plans were 2.1% and 1.8%, respectively. The previous method would have used a single discount rate for both service and interest costs.

The projected benefit obligation (PBO) is the actuarial present value of benefits attributable to employee service rendered to date, including the effects of estimated future salary increases. The following table sets forth the weighted average assumptions used in the calculation of the PBO:

	2017		2016	
	U.S.	International	U.S.	International
Discount rate	3.8 %	2.4 %	3.5 %	2.0 %
Rate of compensation increase	3.5 %	3.6 %	3.5 %	3.5 %

Table of Contents

The following tables reflect the change in the PBO and the change in the fair value of plan assets based on the plan year measurement date, as well as the amounts recognized in the consolidated balance sheets:

	2017		2016	
	U.S.	International	U.S.	International
Change in Projected Benefit Obligation				
Obligation at beginning of year	$3,477.7	$ 1,849.6	$3,139.9	$ 1,647.9
Service cost	29.0	25.9	36.5	24.3
Interest cost	107.5	32.2	110.7	44.3
Amendments	1.9	—	1.2	—
Actuarial (gain) loss	(68.0)	(132.4)	380.2	376.4
Divestitures	—	(34.1)	—	—
Curtailments	(17.3)	(4.2)	(.4)	(1.2)
Settlement (gain) loss	7.0	—	5.4	(3.4)
Special termination benefits	2.8	—	2.0	—
Participant contributions	—	1.4	—	1.6
Benefits paid	(182.9)	(46.5)	(197.4)	(46.6)
Currency translation/other	—	57.6	(.4)	(193.7)
Obligation at End of Year	$3,357.7	$ 1,749.5	$3,477.7	$ 1,849.6

	2017		2016	
	U.S.	International	U.S.	International
Change in Plan Assets				
Fair value at beginning of year	$2,705.3	$ 1,411.1	$2,613.6	$ 1,302.8
Actual return on plan assets	319.6	87.9	275.2	273.2
Company contributions	27.2	42.2	13.9	65.4
Participant contributions	—	1.4	—	1.6
Divestitures	—	(3.0)	—	—
Benefits paid	(182.9)	(46.5)	(197.4)	(46.6)
Settlements	—	(5.3)	—	(3.4)
Currency translation/other	—	52.2	—	(181.9)
Fair Value at End of Year	$2,869.2	$ 1,540.0	$2,705.3	$ 1,411.1
Funded Status at End of Year	$(488.5)	$ (209.5)	$(772.4)	$ (438.5)

Amounts Recognized				
Noncurrent assets	$5.3	$13.1	$—	$—
Accrued liabilities	(12.6)	—	(24.1)	—
Noncurrent liabilities	(481.2)	(222.6)	(748.3)	(438.5)
Net Amount Recognized	$(488.5)	$(209.5)	$(772.4)	$(438.5)

The above table in 2016 includes the projected benefit obligation and plan assets associated with discontinued businesses. Upon completion of the spin-off of Versum on 1 October 2016, the Company transferred defined benefit pension assets and obligations that resulted in a net decrease in the underfunded status of the Company's sponsored pension plans of $24. Additionally, as a result of the transfer of unrecognized losses to Versum, accumulated other comprehensive loss, net of tax, decreased by approximately $5. In connection with the sale of PMD to Evonik on 3 January 2017, the Company transferred defined benefit pension obligations that resulted in a net decrease in the underfunded status of the Company's sponsored pension plans of $7.

Certain U.S. plans offered terminated vested participants an election to receive their accrued pension benefit as a one-time lump sum payment in 2016. Benefits paid in 2016 include $52.9 of lump sum cash payments in connection with this offering.

Table of Contents

The changes in plan assets and benefit obligation that have been recognized in other comprehensive income on a pretax basis during 2017 and 2016 consist of the following:

	2017		2016	
	U.S.	International	U.S.	International
Net actuarial (gain) loss arising during the period	$(189.8)	$ (162.0)	$311.8	$ 172.1
Amortization of net actuarial loss	(103.3)	(55.7)	(90.4)	(36.5)
Prior service cost (credit) arising during the period	1.9	—	1.2	(.1)
Amortization of prior service cost	(2.3)	.1	(2.8)	.2
Total	$(293.5)	$ (217.6)	$219.8	$ 135.7

The net actuarial (gain) loss represents the actual changes in the estimated obligation and plan assets that have not yet been recognized in the consolidated income statements and are included in accumulated other comprehensive loss. Actuarial gains arising during 2017 are primarily attributable to higher discount rates and higher than expected return on plan assets. Accumulated actuarial gains and losses that exceed a corridor are amortized over the average remaining service period of participants, which was approximately 9 years as of 30 September 2017.

The components recognized in accumulated other comprehensive loss on a pretax basis at 30 September consisted of:

	2017		2016	
	U.S.	International	U.S.	International
Net actuarial loss	$980.5	$ 551.9	$1,273.6	$ 769.6
Prior service cost (credit)	8.1	(1.8)	8.5	(1.9)
Net transition liability	—	.4	—	.4
Total	$988.6	$ 550.5	$1,282.1	$ 768.1

The amount of accumulated other comprehensive loss at 30 September 2017 that is expected to be recognized as a component of net periodic pension cost during fiscal year 2018, excluding discontinued operations and amounts that may be recognized through settlement losses, is as follows:

	U.S.	International
Net actuarial loss	$88.5	$ 39.9
Prior service cost (credit)	1.5	(.1)

The accumulated benefit obligation (ABO) is the actuarial present value of benefits attributed to employee service rendered to a particular date, based on current salaries. The ABO for all defined benefit pension plans was $4,842.8 and $4,954.9 as of 30 September 2017 and 2016, respectively.

The following table provides information on pension plans where the benefit liability exceeds the value of plan assets:

	30 September 2017		30 September 2016	
	U.S.	International	U.S.	International
Pension Plans with PBO in Excess of Plan Assets:				
PBO	$3,116.7	$ 465.7	$3,477.7	$ 1,849.6
Fair value of plan assets	2,623.0	243.1	2,705.3	1,411.1
Pension Plans with ABO in Excess of Plan Assets:				
ABO	$2,951.0	$ 365.6	$3,242.5	$ 1,673.6
Fair value of plan assets	2,623.0	197.1	2,705.3	1,370.1

Included in the tables above are several pension arrangements that are not funded because of jurisdictional practice. The ABO and PBO related to these plans as of 30 September 2017 were $99.0 and $107.8, respectively.

Table of Contents

Pension Plan Assets

Our pension plan investment strategy is to invest in diversified portfolios to earn a long-term return consistent with acceptable risk in order to pay retirement benefits and meet regulatory funding requirements while minimizing company cash contributions over time. De-risking strategies are also employed for closed plans as funding improves, generally resulting in higher allocations to long duration bonds. The plans invest primarily in passive and actively managed equity and debt securities. Equity investments are diversified geographically and by investment style and market capitalization. Fixed income investments include sovereign, corporate and asset-backed securities generally denominated in the currency of the plan.

Asset allocation targets are established based on the long-term return, volatility and correlation characteristics of the asset classes, the profiles of the plans' liabilities, and acceptable levels of risk. Actual allocations vary from target due to market changes and are reviewed regularly. Assets are routinely rebalanced through contributions, benefit payments, and otherwise as deemed appropriate. The actual and target allocations at the measurement date are as follows:

	2017 Target Allocation		2017 Actual Allocation		2016 Actual Allocation	
	U.S.	International	U.S.	International	U.S.	International
Asset Category						
Equity securities	46-66%	46-57%	58 %	53 %	65 %	60 %
Debt securities	32-42%	41-53%	34 %	46 %	28 %	38 %
Real estate/other	0-10%	0-2%	7 %	1 %	7 %	1 %
Cash	—	—	1 %	— %	— %	1 %
Total			100 %	100 %	100 %	100 %

In 2017, the 8.0% expected return for U.S. plan assets was based on a weighted average of estimated long-term returns of major asset classes and the historical performance of plan assets. The estimated long-term return for equity, debt securities, and real estate is 8.2%, 5.0%, and 7.0%, respectively. In determining asset class returns, we take into account historical long-term returns and the value of active management, as well as other economic and market factors.

In 2017, the 6.1% expected rate of return for international plan assets was based on a weighted average return for plans outside the U.S., which vary significantly in size, asset structure and expected returns. The expected asset return for the U.K. plan, which represents over 80% of the assets of our International plans, is 6.6% and was derived from expected equity and debt security returns of 7.3% and 3.5%, respectively.

Table of Contents

The following table summarizes pension plan assets measured at fair value by asset class (see Note 14, Fair Value Measurements, for definition of the levels):

	30 September 2017				30 September 2016			
	Total	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3
U.S. Qualified Pension Plans								
Cash and cash equivalents	$13.6	$13.6	$—	$—	$12.7	$12.7	$—	$—
Equity securities	598.6	598.6	—	—	637.0	637.0	—	—
Equity mutual funds	276.5	276.5	—	—	300.2	300.2	—	—
Equity pooled funds	787.0	—	787.0	—	815.5	—	815.5	—
Fixed income:								
Bonds (government and corporate)	985.7	—	985.7	—	747.8	—	747.8	—
Real estate pooled funds	207.8	—	—	207.8	192.1	—	—	192.1
Total U.S. Qualified Pension Plans	$2,869.2	$888.7	$1,772.7	$207.8	$2,705.3	$949.9	$1,563.3	$192.1
International Pension Plans								
Cash and cash equivalents	$7.3	$7.3	$—	$—	$6.6	$6.6	$—	$—
Equity pooled funds	821.4	—	821.4	—	854.8	—	854.8	—
Fixed income pooled funds	651.3	—	651.3	—	486.9	—	486.9	—
Other pooled funds	18.6	—	10.8	7.8	17.0	—	9.7	7.3
Insurance contracts	41.4	—	—	41.4	45.8	—	—	45.8
Total International Pension Plans	$1,540.0	$7.3	$1,483.5	$49.2	$1,411.1	$6.6	$1,351.4	$53.1

The above table in 2016 includes plan assets associated with discontinued businesses. Upon completion of the spin-off of Versum on 1 October 2016, the Company transferred approximately $3 of international plan assets.

The following table summarizes changes in fair value of the pension plan assets classified as Level 3, by asset class:

	Real Estate Pooled Funds	Other Pooled Funds	Insurance Contracts	Total
30 September 2015	$ 174.2	$ 6.6	$ 45.3	$226.1
Actual return on plan assets:				
Assets held at end of year	17.9	.1	3.2	21.2
Assets sold during the period	—	.3	—	.3
Purchases, sales, and settlements, net	—	.3	(2.7)	(2.4)
30 September 2016	$ 192.1	$ 7.3	$ 45.8	$245.2
Actual return on plan assets:				
Assets held at end of year	15.7	1.2	(1.0)	15.9
Assets sold during the period	—	.3	—	.3
Purchases, sales, and settlements, net	—	(1.0)	(3.4)	(4.4)
30 September 2017	$ 207.8	$ 7.8	$ 41.4	$257.0

The descriptions and fair value methodologies for the U.S. and International pension plan assets are as follows:

Cash and Cash Equivalents

The carrying amounts of cash and cash equivalents approximate fair value due to the short-term maturity.

Table of Contents

Equity Securities

Equity securities are valued at the closing market price reported on a U.S. or international exchange where the security is actively traded and are therefore classified as Level 1 assets.

Mutual and Pooled Funds

Shares of mutual funds are valued at the net asset value (NAV) of the fund and are classified as Level 1 assets. Units of pooled funds are valued at the per unit NAV determined by the fund manager and are classified as Level 2 assets.

Corporate and Government Bonds

Corporate and government bonds are classified as Level 2 assets, as they are either valued at quoted market prices from observable pricing sources at the reporting date or valued based upon comparable securities with similar yields and credit ratings.

Real Estate Pooled Funds

Real estate pooled funds are classified as Level 3 assets, as they are carried at the estimated fair value of the underlying properties. Estimated fair value is calculated utilizing a combination of key inputs, such as revenue and expense growth rates, terminal capitalization rates, and discount rates. These key inputs are consistent with practices prevailing within the real estate investment management industry.

Other Pooled Funds

Other pooled funds classified as Level 2 assets are valued at the NAV of the shares held at year end, which is based on the fair value of the underlying investments. Securities and interests classified as Level 3 are carried at the estimated fair value. The estimated fair value is based on the fair value of the underlying investment values, which includes estimated bids from brokers or other third-party vendor sources that utilize expected cash flow streams and other uncorroborated data including counterparty credit quality, default risk, discount rates, and the overall capital market liquidity.

Insurance Contracts

Insurance contracts are classified as Level 3 assets, as they are carried at contract value, which approximates the estimated fair value. The estimated fair value is based on the fair value of the underlying investment of the insurance company.

Contributions and Projected Benefit Payments

Pension contributions to funded plans and benefit payments for unfunded plans for fiscal year 2017 were $64.1. Contributions for funded plans resulted primarily from contractual and regulatory requirements. Benefit payments to unfunded plans were due primarily to the timing of retirements and cost reduction actions. We anticipate contributing $50 to $70 to the defined benefit pension plans in 2018. These contributions are anticipated to be driven primarily by contractual and regulatory requirements for funded plans and benefit payments for unfunded plans, which are dependent upon timing of retirements.

Projected benefit payments, which reflect expected future service, are as follows:

	U.S.	International
2018	$158.5	$ 50.9
2019	163.4	53.4
2020	167.3	53.8
2021	171.4	56.8
2022	177.2	59.3
2023-2027	938.5	333.3

These estimated benefit payments are based on assumptions about future events. Actual benefit payments may vary significantly from these estimates.

Table of Contents

Defined Contribution Plans

We maintain a nonleveraged employee stock ownership plan (ESOP) which forms part of the Air Products and Chemicals, Inc. Retirement Savings Plan (RSP). The ESOP was established in May of 2002. The balance of the RSP is a qualified defined contribution plan including a 401(k) elective deferral component. A substantial portion of U.S. employees are eligible and participate.

We treat dividends paid on ESOP shares as ordinary dividends. Under existing tax law, we may deduct dividends which are paid with respect to shares held by the plan. Shares of the Company's common stock in the ESOP totaled 2,483,225 as of 30 September 2017.

Our contributions to the RSP include a Company core contribution for certain eligible employees who do not receive their primary retirement benefit from the defined benefit pension plans, with the core contribution based on a percentage of pay that is dependent on years of service. For the RSP, we also make matching contributions on overall employee contributions as a percentage of the employee contribution and include an enhanced contribution for certain eligible employees that do not participate in the defined benefit pension plans. Worldwide contributions, excluding discontinued operations, expensed to income in 2017, 2016, and 2015 were $33.7, $34.6, and $36.8, respectively.

Other Postretirement Benefits

We provide other postretirement benefits consisting primarily of healthcare benefits to certain U.S. retirees who meet age and service requirements. The healthcare benefit is a continued medical benefit until the retiree reaches age 65. Healthcare benefits are contributory, with contributions adjusted periodically. The retiree medical costs are capped at a specified dollar amount, with the retiree contributing the remainder.

The cost of our other postretirement benefit plans includes the following components:

	2017	2016	2015
Service cost	$1.1	$2.2	$2.8
Interest cost	1.6	2.0	2.2
Amortization of net actuarial loss	.2	.7	.8
Net Periodic Postretirement Cost	$2.9	$4.9	$5.8
Less: Discontinued Operations	$—	$(.4)	$(.7)
Net Periodic Postretirement Cost – Continuing Operations	$2.9	$4.5	$5.1

We calculate net periodic postretirement cost for a given fiscal year based on assumptions developed at the end of the previous fiscal year. The discount rate assumption used in the calculation of net periodic postretirement cost for 2017, 2016, and 2015 was 1.9%, 2.4%, and 2.6%, respectively.

We measure the other postretirement benefits as of 30 September. The discount rate assumption used in the calculation of the accumulated postretirement benefit obligation was 2.4% and 1.9% for 2017 and 2016, respectively.

The following table reflects the change in the accumulated postretirement benefit obligation and the amounts recognized in the consolidated balance sheets:

	2017	2016
Obligation at beginning of year	$86.3	$86.9
Service cost	1.1	2.2
Interest cost	1.6	2.0
Actuarial loss (gain)	(7.2)	7.5
Curtailment gain	(3.5)	—
Benefits paid	(11.3)	(12.3)
Obligation at End of Year	$67.0	$86.3
Amounts Recognized		
Accrued liabilities	$10.0	$11.4
Noncurrent liabilities	57.0	74.9

Table of Contents

In 2016, the above table included the projected benefit obligations associated with discontinued businesses.
The changes in benefit obligation that have been recognized in other comprehensive income on a pretax basis during 2017 and 2016 for our other postretirement benefit plans consist of the following:

	2017	2016
Net actuarial loss (gain) arising during the period	$(10.7)	$7.5
Amortization of net actuarial loss	(.2)	(.7)
Total	$(10.9)	$6.8

The net actuarial loss recognized in accumulated other comprehensive loss on a pretax basis was $7.8 at 30 September 2017 and $18.7 at 30 September 2016. Of the 30 September 2017 net actuarial loss, it is estimated that $.3, which excludes discontinued operations, will be amortized into net periodic postretirement cost during fiscal year 2018.
The effect of a change in the healthcare trend rate is tempered by a cap on the average retiree medical cost. The expected per capita claims costs are currently assumed to be greater than the annual cap; therefore, the assumed healthcare cost trend rate, ultimate trend rate, and the year the ultimate trend rate is reached in 2017 and 2016 does not apply as it has no impact on plan obligations.
Projected benefit payments are as follows:

2018	$10.1
2019	9.5
2020	9.0
2021	8.4
2022	7.7
2023-2027	24.2

These estimated benefit payments are based on assumptions about future events. Actual benefit payments may vary significantly from these estimates.

17. COMMITMENTS AND CONTINGENCIES

LITIGATION

We are involved in various legal proceedings, including commercial, competition, environmental, health, safety, product liability, and insurance matters. In September 2010, the Brazilian Administrative Council for Economic Defense (CADE) issued a decision against our Brazilian subsidiary, Air Products Brasil Ltda., and several other Brazilian industrial gas companies for alleged anticompetitive activities. CADE imposed a civil fine of R$179.2 million (approximately $57 at 30 September 2017) on Air Products Brasil Ltda. This fine was based on a recommendation by a unit of the Brazilian Ministry of Justice, whose investigation began in 2003, alleging violation of competition laws with respect to the sale of industrial and medical gases. The fines are based on a percentage of our total revenue in Brazil in 2003.
We have denied the allegations made by the authorities and filed an appeal in October 2010 with the Brazilian courts. On 6 May 2014, our appeal was granted and the fine against Air Products Brasil Ltda. was dismissed. CADE has appealed that ruling and the matter remains pending. We, with advice of our outside legal counsel, have assessed the status of this matter and have concluded that, although an adverse final judgment after exhausting all appeals is possible, such a judgment is not probable. As a result, no provision has been made in the consolidated financial statements. We estimate the maximum possible loss to be the full amount of the fine of R$179.2 million (approximately $57 at 30 September 2017) plus interest accrued thereon until final disposition of the proceedings. Other than this matter, we do not currently believe there are any legal proceedings, individually or in the aggregate, that are reasonably possible to have a material impact on our financial condition, results of operations, or cash flows.

ENVIRONMENTAL

In the normal course of business, we are involved in legal proceedings under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA: the federal Superfund law); Resource Conservation and Recovery Act (RCRA); and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Presently, there are approximately 32 sites on which a final settlement has not been reached where we, along with others, have been designated a potentially responsible party by the Environmental Protection Agency or are otherwise engaged in investigation or remediation, including cleanup activity at certain of our current and former manufacturing sites. We continually monitor these sites for which we have environmental exposure.

Accruals for environmental loss contingencies are recorded when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. The consolidated balance sheets at 30 September 2017 and 2016 included an accrual of $83.6 and $81.4, respectively, primarily as part of other noncurrent liabilities. The environmental liabilities will be paid over a period of up to 30 years. We estimate the exposure for environmental loss contingencies to range from $83 to a reasonably possible upper exposure of $97 as of 30 September 2017.

Actual costs to be incurred at identified sites in future periods may vary from the estimates, given inherent uncertainties in evaluating environmental exposures. Using reasonably possible alternative assumptions of the exposure level could result in an increase to the environmental accrual. Due to the inherent uncertainties related to environmental exposures, a significant increase to the reasonably possible upper exposure level could occur if a new site is designated, the scope of remediation is increased, a different remediation alternative is identified, or a significant increase in our proportionate share occurs. We do not expect that any sum we may have to pay in connection with environmental matters in excess of the amounts recorded or disclosed above would have a material adverse impact on our financial position or results of operations in any one year.

Pace

At 30 September 2017, $28.9 of the environmental accrual was related to the Pace facility.

In 2006, we sold our Amines business, which included operations at Pace, Florida, and recognized a liability for retained environmental obligations associated with remediation activities at Pace. We are required by the Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection Agency (USEPA) to continue our remediation efforts. We estimated that it would take a substantial period of time to complete the groundwater remediation, and the costs through completion were estimated to range from $42 to $52. As no amount within the range was a better estimate than another, we recognized a pretax expense in fiscal 2006 of $42 as a component of income from discontinued operations and recorded an environmental accrual of $42 in continuing operations on the consolidated balance sheets. There has been no change to the estimated exposure range related to the Pace facility.

We have implemented many of the remedial corrective measures at the Pace facility required under 1995 Consent Orders issued by the FDEP and the USEPA. Contaminated soils have been bioremediated, and the treated soils have been secured in a lined on-site disposal cell. Several groundwater recovery systems have been installed to contain and remove contamination from groundwater. We completed an extensive assessment of the site to determine how well existing measures are working, what additional corrective measures may be needed, and whether newer remediation technologies that were not available in the 1990s might be suitable to more quickly and effectively remove groundwater contaminants. Based on assessment results, we completed a focused feasibility study that has identified alternative approaches that may more effectively remove contaminants. We continue to review alternative remedial approaches with the FDEP and recently started additional field work to support the design of an improved groundwater recovery network with the objective of targeting areas of higher contaminant concentration and avoiding areas of high groundwater iron which has proven to be a significant operability issue for the project. In the first quarter of 2015, we entered into a new Consent Order with the FDEP requiring us to continue our remediation efforts at the Pace facility. The costs we are incurring under the new Consent Order are expected to be consistent with our previous estimates.

Table of Contents

Piedmont

At 30 September 2017, $16.7 of the environmental accrual was related to the Piedmont site.

On 30 June 2008, we sold our Elkton, Maryland, and Piedmont, South Carolina, production facilities and the related North American atmospheric emulsions and global pressure sensitive adhesives businesses. In connection with the sale, we recognized a liability for retained environmental obligations associated with remediation activities at the Piedmont site. This site is under active remediation for contamination caused by an insolvent prior owner. We are required by the South Carolina Department of Health and Environmental Control (SCDHEC) to address both contaminated soil and groundwater. Numerous areas of soil contamination have been addressed, and contaminated groundwater is being recovered and treated. On 13 June 2017, the SCDHEC issued its final approval to the site-wide feasibility study, and with that we will be moving towards a record of decision for the Piedmont site and into the final remedial design phase of this project. We estimate that it will take until 2019 to complete source area remediation, with groundwater recovery and treatment continuing through 2029. Thereafter, we are expecting this site to go into a state of monitored natural attenuation through 2047. We recognized a pretax expense in 2008 of $24 as a component of income from discontinued operations and recorded an environmental liability of $24 in continuing operations on the consolidated balance sheets. There have been no significant changes to the estimated exposure.

Pasadena

At 30 September 2017, $12.1 of the environmental accrual was related to the Pasadena site.

During the fourth quarter of 2012, management committed to permanently shutting down our polyurethane intermediates (PUI) production facility in Pasadena, Texas. In shutting down and dismantling the facility, we have undertaken certain obligations related to soil and groundwater contaminants. We have been pumping and treating groundwater to control off-site contaminant migration in compliance with regulatory requirements and under the approval of the Texas Commission on Environmental Quality (TCEQ). We estimate that the pump and treat system will continue to operate until 2042. We plan to perform additional work to address other environmental obligations at the site. This additional work includes remediating, as required, impacted soils, investigating groundwater west of the former PUI facility, performing post closure care for two closed RCRA surface impoundment units, and establishing engineering controls. In 2012, we estimated the total exposure at this site to be $13. There have been no significant changes to the estimated exposure.

ASSET RETIREMENT OBLIGATIONS

Our asset retirement obligations are primarily associated with on-site long-term supply contracts under which we have built a facility on land owned by the customer and are obligated to remove the facility at the end of the contract term. The retirement of assets includes the contractually required removal of a long-lived asset from service and encompasses the sale, removal, abandonment, recycling, or disposal of the assets as required at the end of the contract terms. The timing and/or method of settlement of these obligations are conditional on a future event that may or may not be within our control.

Changes to the carrying amount of our asset retirement obligations are as follows:

Balance at 30 September 2015	$109.4
Additional accruals	10.4
Liabilities settled	(4.4)
Accretion expense	5.4
Currency translation adjustment	(.9)
Balance at 30 September 2016	$119.9
Additional accruals	22.7
Liabilities settled	(4.1)
Accretion expense	5.8
Currency translation adjustment	.4
Balance at 30 September 2017	$144.7

These obligations are primarily reflected in "Other noncurrent liabilities" on the consolidated balance sheets.

Table of Contents

GUARANTEES AND WARRANTIES

In April 2015, we entered into joint venture arrangements in Saudi Arabia. An equity bridge loan has been provided to the joint venture until 2020 to fund equity commitments. We guaranteed the repayment of our 25% share of this loan, and our venture partner guaranteed repayment of its share. Our maximum exposure under the guarantee is approximately $100. As of 30 September 2017 and 2016, we recorded a noncurrent liability of $94.4 for our obligation to make future equity contributions based on our proportionate share of the advances received by the joint venture under the loan.

Air Products has also entered into a long-term sale of equipment contract with the joint venture to engineer, procure, and construct the industrial gas facilities that will supply gases to Saudi Aramco. We have provided bank guarantees to the joint venture of up to $262 to support our performance under the contract. Exposures under the guarantees decline over time and will be completely extinguished after completion of the project.

We are party to an equity support agreement and operations guarantee related to an air separation facility constructed in Trinidad for a venture in which we own 50%. At 30 September 2017, maximum potential payments under joint and several guarantees were $28.0. Exposures under the guarantees decline over time and will be completely extinguished by 2024.

During the first quarter of 2014, we sold the remaining portion of our Homecare business and entered into an operations guarantee related to obligations under certain homecare contracts assigned in connection with the transaction. Our maximum potential payment under the guarantee is £20 million (approximately $25 at 30 September 2017), and our exposure will be extinguished by 2020.

To date, no equity contributions or payments have been made since the inception of these guarantees. The fair value of the above guarantees is not material.

We, in the normal course of business operations, have issued product warranties related to equipment sales. Also, contracts often contain standard terms and conditions which typically include a warranty and indemnification to the buyer that the goods and services purchased do not infringe on third-party intellectual property rights. The provision for estimated future costs relating to warranties is not material to the consolidated financial statements.

We do not expect that any sum we may have to pay in connection with guarantees and warranties will have a material adverse effect on our consolidated financial condition, liquidity, or results of operations.

UNCONDITIONAL PURCHASE OBLIGATIONS

We are obligated to make future payments under unconditional purchase obligations as summarized below:

2018	$822
2019	234
2020	275
2021	309
2022	285
Thereafter	4,608
Total	$6,533

Approximately $5,600 of our unconditional purchase obligations relate to helium purchases, which include crude feedstock supply to multiple helium refining plants in North America as well as refined helium purchases from sources around the world. As a rare byproduct of natural gas production in the energy sector, these helium sourcing agreements are medium- to long-term and contain take-or-pay provisions. The refined helium is distributed globally and sold as a merchant gas, primarily under medium-term requirements contracts. While contract terms in the energy sector are longer than those in merchant, helium is a rare gas used in applications with few or no substitutions because of its unique physical and chemical properties.

Approximately $280 of our long-term unconditional purchase obligations relate to feedstock supply for numerous HyCO (hydrogen, carbon monoxide, and syngas) facilities. The price of feedstock supply is principally related to the price of natural gas. However, long-term take-or-pay sales contracts to HyCO customers are generally matched to the term of the feedstock supply obligations and provide recovery of price increases in the feedstock supply. Due to the matching of most long-term feedstock supply obligations to customer sales contracts, we do not believe these purchase obligations would have a material effect on our financial condition or results of operations.

Table of Contents

The unconditional purchase obligations also include other product supply and purchase commitments and electric power and natural gas supply purchase obligations, which are primarily pass-through contracts with our customers. Purchase commitments to spend approximately $300 for additional plant and equipment are included in the unconditional purchase obligations in 2018. In addition, we have purchase commitments totaling approximately $180 in 2018 relating to our long-term sale of equipment project for Saudi Aramco’s Jazan oil refinery.

18. CAPITAL STOCK

Common Stock

Authorized common stock consists of 300 million shares with a par value of $1 per share. As of 30 September 2017, 249 million shares were issued, with 218 million outstanding.

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1,000 of our outstanding common stock. We repurchase shares pursuant to Rules 10b5-1 and 10b-18 under the Securities Exchange Act of 1934, as amended, through repurchase agreements established with several brokers. We did not purchase any of our outstanding shares during fiscal year 2017. At 30 September 2017, $485.3 in share repurchase authorization remains.

The following table reflects the changes in common shares:

Year ended 30 September	2017	2016	2015
Number of Common Shares Outstanding			
Balance, beginning of year	217,350,825	215,359,113	213,538,144
Issuance of treasury shares for stock option and award plans	995,249	1,991,712	1,820,969
Balance, end of year	218,346,074	217,350,825	215,359,113

Preferred Stock

Authorized preferred stock consists of 25 million shares with a par value of $1 per share, of which 2.5 million were designated as Series A Junior Participating Preferred Stock. There were no shares issued or outstanding as of 30 September 2017 and 2016.

19. SHARE-BASED COMPENSATION

We have various share-based compensation programs, which include deferred stock units, stock options, and restricted stock. Under all programs, the terms of the awards are fixed at the grant date. We issue shares from treasury stock upon the payout of deferred stock units, the exercise of stock options, and the issuance of restricted stock awards. Share information presented is on a total company basis. As of 30 September 2017, there were 4,922,382 shares available for future grant under our Long-Term Incentive Plan (LTIP), which is shareholder approved.

In connection with the spin-off of Versum, the Company adjusted the number of deferred stock units and stock options pursuant to existing anti-dilution provisions in the LTIP to preserve the intrinsic value of the awards immediately before and after the separation. The outstanding awards will continue to vest over the original vesting period defined at the grant date. Outstanding awards at the time of spin-off were primarily converted into awards of the holders' employer following the separation.

Stock awards held upon separation were adjusted based upon the conversion ratio of Air Products' New York Stock Exchange (“NYSE”) volume weighted-average closing stock price on 30 September 2016 ($150.35) to the NYSE volume weighted-average opening stock price on 3 October 2016 ($140.38), or 1.071. The adjustment to the awards did not result in incremental fair value, and no incremental compensation expense was recorded related to the conversion of these awards.

Table of Contents

Share-based compensation cost recognized in the consolidated income statements is summarized below:

	2017	2016	2015
Before-Tax Share-Based Compensation Cost – Total	$40.7	$37.6	$45.7
Before-Tax Share-Based Compensation Cost – Discontinued Operations	.8	6.6	6.2
Before-Tax Share-Based Compensation Cost – Continuing Operations	$39.9	$31.0	$39.5
Income tax benefit – Continuing Operations	(14.0)	(10.8)	(13.8)
After-Tax Share-Based Compensation Cost – Continuing Operations	$25.9	$20.2	$25.7

Before-tax share-based compensation cost is primarily included in selling and administrative expense on our consolidated income statements. The amount of share-based compensation cost capitalized in 2017, 2016, and 2015 was not material.

On a total company basis, before-tax share-based compensation cost by type of program was as follows:

	2017	2016	2015
Deferred stock units	$34.5	$29.9	$28.8
Stock options	1.4	4.2	12.6
Restricted stock	4.8	3.5	4.3
Before-Tax Share-Based Compensation Cost – Total	$40.7	$37.6	$45.7

Deferred Stock Units

We have granted deferred stock units to executives, selected employees, and outside directors. These deferred stock units entitle the recipient to one share of common stock upon vesting, which is conditioned, for employee recipients, on continued employment during the deferral period and may be conditioned on achieving certain performance targets. We grant deferred stock unit awards with a two- to five-year deferral period that is subject to payout upon death, disability, or retirement. Deferred stock units issued to outside directors are paid after service on the Board of Directors ends at the time elected by the director (not to exceed 10 years after service ends). We generally expense the grant-date fair value of these awards on a straight-line basis over the vesting period; however, expense recognition is accelerated for retirement eligible individuals who meet the requirements for vesting upon retirement.

Market-based deferred stock units vest as long as the employee continues to be employed by the Company and upon the achievement of the performance target. The performance target, which is approved by the Compensation Committee, is the Company’s total shareholder return (share price appreciation and dividends paid) in relation to a defined peer group over a three year performance period. In 2017, we granted 117,692 market-based deferred stock units that are earned out at the end of the three-year performance period beginning 1 October 2016 and ending 30 September 2019. In 2016, we granted 130,167 market-based deferred stock units that are earned out at the end of the three-year performance period beginning 1 October 2015 and ending 30 September 2018.

The fair value of market-based deferred stock units was estimated using a Monte Carlo simulation model as these equity awards are tied to a market condition. The model utilizes multiple input variables that determine the probability of satisfying the market condition stipulated in the grant and calculates the fair value of the awards. We generally expense the grant-date fair value of these awards on a straight-line basis over the vesting period. The calculation of the fair value of market-based deferred stock units used the following assumptions:

	2017	2016
Expected volatility	20.6%	20.5%
Risk-free interest rate	1.4 %	1.2 %
Expected dividend yield	2.5 %	2.2 %

The estimated grant-date fair value of market-based deferred stock units was $156.87 and $135.49 per unit in 2017 and 2016, respectively.

In addition, during 2017, we granted 165,121 time-based deferred stock units at a weighted average grant-date fair value of $143.75.

Table of Contents

Deferred Stock Units	Shares (000)	Weighted Average Grant-Date Fair Value
Outstanding at 30 September 2016	1,001	$ 119.44
Equitable adjustment upon separation[(A)]	65	—
Surrender upon separation[(B)]	(89)	132.88
Granted	283	148.89
Paid out	(235)	83.65
Forfeited/adjustments	(50)	121.99
Outstanding at 30 September 2017	975	$ 127.29

(A) Applicable deferred stock units have been adjusted by the conversion ratio of 1.071 to preserve the intrinsic value immediately before and after the spin-off of Versum.

(B) In connection with the spin-off of Versum, EMD employees surrendered their outstanding Air Products equity awards, which were converted into Versum equity awards of equivalent fair value.

Cash payments made for deferred stock units were $2.1, $2.9, and $9.6 in 2017, 2016, and 2015, respectively. As of 30 September 2017, there was $39.0 of unrecognized compensation cost related to deferred stock units. The cost is expected to be recognized over a weighted average period of 2.0 years. The total fair value of deferred stock units paid out during 2017, 2016, and 2015, including shares vested in prior periods, was $36.6, $41.6, and $35.5, respectively.

Stock Options

We have granted awards of options to purchase common stock to executives and selected employees. The exercise price of stock options equals the market price of our stock on the date of the grant. Options generally vest incrementally over three years, and remain exercisable for ten years from the date of grant. In 2017 and 2016, no stock options were awarded.

Fair values of stock options were estimated using a Black Scholes model that used the assumptions noted in the table below. Expected volatility and expected dividend yield are based on actual historical experience of our stock and dividends over the historical period equal to the expected life. The expected life represents the period of time that options granted are expected to be outstanding based on an analysis of Company-specific historical exercise data. Ranges are used when certain groups of employees exhibit different behavior, such as timing of exercise. The risk-free rate is based on the U.S. Treasury Strips with terms equal to the expected time of exercise as of the grant date.

	2015
Expected volatility	30.3 %
Expected dividend yield	2.6 %
Expected life (in years)	7.5
Risk-free interest rate	2.2 %

The weighted average grant-date fair value of options granted during 2015 was $37.19 per option.

Table of Contents

A summary of stock option activity is presented below:

Stock Options	Shares (000)	Weighted Average Exercise Price
Outstanding at 30 September 2016	3,916	$ 90.28
Equitable adjustment upon separation[(A)]	277	—
Surrender upon separation[(B)]	(102)	97.63
Exercised	(886)	80.76
Forfeited	(3)	105.28
Outstanding at 30 September 2017	3,202	$ 84.85
Exercisable at 30 September 2017	3,149	$ 84.00

Stock Options	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Outstanding at 30 September 2017	4.3	$ 213
Exercisable at 30 September 2017	4.3	$ 212

(A) Applicable deferred stock units have been adjusted by the conversion ratio of 1.071 to preserve the intrinsic value immediately before and after the spin-off of Versum.

(B) In connection with the spin-off of Versum, EMD employees surrendered their outstanding Air Products equity awards, which were converted into Versum equity awards of equivalent fair value.

The aggregate intrinsic value represents the amount by which our closing stock price of $151.22 as of 30 September 2017 exceeds the exercise price multiplied by the number of in-the-money options outstanding or exercisable.

On a total company basis, the intrinsic value of stock options exercised during 2017, 2016, and 2015 was $57.3, $115.3, and $115.5, respectively.

Compensation cost is generally recognized over the stated vesting period consistent with the terms of the arrangement (i.e., either on a straight-line or graded-vesting basis). Expense recognition is accelerated for retirement-eligible individuals who would meet the requirements for vesting of awards upon their retirement. As of 30 September 2017, there was $.1 of unrecognized compensation cost related to nonvested stock options, which is expected to be recognized over a weighted average period of 0.2 years.

Cash received from option exercises during 2017 was $68.4. The total tax benefit realized from stock option exercises in 2017 was $19.9, of which $13.9 was the excess tax benefit.

Restricted Stock

The grant-date fair value of restricted stock is estimated on the date of grant based on the closing price of the stock, and compensation cost is generally amortized to expense on a straight-line basis over the vesting period during which employees perform related services. Expense recognition is accelerated for retirement-eligible individuals who would meet the requirements for vesting of awards upon their retirement.

We have issued shares of restricted stock to certain officers. Participants are entitled to cash dividends and to vote their respective shares. Restrictions on shares lift in one to four years or upon the earlier of retirement, death, or disability. The shares are nontransferable while subject to forfeiture.

Table of Contents

A summary of restricted stock activity is presented below:

Restricted Stock	Shares (000)	Weighted Average Grant-Date Fair Value
Outstanding at 30 September 2016	85	$ 128.16
Vested	(29)	113.50
Outstanding at 30 September 2017	56	$ 135.74

As of 30 September 2017, there was $.4 of unrecognized compensation cost related to restricted stock awards. The cost is expected to be recognized over a weighted average period of 1.4 years. The total fair value of restricted stock vested during 2017, 2016, and 2015 was $4.1, $4.3, and $1.4, respectively.

20. ACCUMULATED OTHER COMPREHENSIVE LOSS

The table below summarizes changes in AOCL, net of tax, attributable to Air Products:

	Derivatives qualifying as hedges	Foreign currency translation adjustments	Pension and postretirement benefits	Total
Balance at 30 September 2014	$ (28.5)	$ (268.7)	$ (944.7)	$ (1,241.9)
Other comprehensive loss before reclassifications	(35.0)	(699.3)	(278.5)	(1,012.8)
Amounts reclassified from AOCL	20.8	—	97.0	117.8
Net current period other comprehensive loss	$ (14.2)	$ (699.3)	$ (181.5)	$ (895.0)
Amount attributable to noncontrolling interest	.2	(11.5)	.3	(11.0)
Balance at 30 September 2015	$ (42.9)	$ (956.5)	$ (1,126.5)	$ (2,125.9)
Other comprehensive income (loss) before reclassifications	13.7	9.9	(335.1)	(311.5)
Amounts reclassified from AOCL	(36.0)	2.7	87.2	53.9
Net current period other comprehensive income (loss)	$ (22.3)	$ 12.6	$ (247.9)	$ (257.6)
Amount attributable to noncontrolling interest	(.2)	5.4	(.4)	4.8
Balance at 30 September 2016	$ (65.0)	$ (949.3)	$ (1,374.0)	$ (2,388.3)
Other comprehensive income (loss) before reclassifications	(12.6)	101.9	251.6	340.9
Amounts reclassified from AOCL	24.2	57.3	110.7	192.2
Net current period other comprehensive income	$ 11.6	$ 159.2	$ 362.3	$ 533.1
Spin-off of Versum	.2	6.0	5.3	11.5
Amount attributable to noncontrolling interest	(.1)	3.0	.8	3.7
Balance at 30 September 2017	$ (53.1)	$ (787.1)	$ (1,007.2)	$ (1,847.4)

Table of Contents

The table below summarizes the reclassifications out of accumulated other comprehensive loss and the affected line item on the consolidated income statements:

	2017	2016	2015
(Gain) Loss on Cash Flow Hedges, net of tax			
Sales/Cost of sales	$18.3	$.2	$.6
Other income (expense), net	5.1	(46.2)	16.9
Interest expense	.8	10.0	3.3
Total (Gain) Loss on Cash Flow Hedges, net of tax	$24.2	$(36.0)	$20.8
Currency Translation Adjustment			
Business restructuring and cost reduction actions(A)	$8.2	$—	$—
Income from discontinued operations, net of tax(B)	49.1	2.7	—
Total Currency Translation Adjustment	$57.3	$2.7	$—
Pension and Postretirement Benefits, net of tax(C)	$110.7	$87.2	$97.0

(A) The fiscal year 2017 impact relates to the planned sale of a non-industrial gas hardgoods business in the Industrial Gases – Americas segment recorded in the third quarter.

(B) The fiscal year 2017 impact relates to the sale of PMD during the second quarter. The fiscal year 2016 impact primarily relates to the sale of an equity affiliate in the first quarter.

(C) The components include items such as prior service cost amortization, actuarial loss amortization, and settlements and are reflected in net periodic benefit cost. Refer to Note 16, Retirement Benefits.

21. EARNINGS PER SHARE

The following table sets forth the computation of basic and diluted earnings per share (EPS):

30 September	2017	2016	2015
Numerator			
Income from continuing operations	$1,134.4	$1,099.5	$933.3
Income (Loss) from discontinued operations	1,866.0	(468.4)	344.6
Net Income Attributable to Air Products	$3,000.4	$631.1	$1,277.9
Denominator (in millions)			
Weighted average common shares — Basic	218.0	216.4	214.9
Effect of dilutive securities			
Employee stock option and other award plans	1.8	1.9	2.4
Weighted average common shares — Diluted	219.8	218.3	217.3
Basic EPS Attributable to Air Products			
Income from continuing operations	$5.20	$5.08	$4.34
Income (Loss) from discontinued operations	8.56	(2.16)	1.61
Net Income Attributable to Air Products	$13.76	$2.92	$5.95
Diluted EPS Attributable to Air Products			
Income from continuing operations	$5.16	$5.04	$4.29
Income (Loss) from discontinued operations	8.49	(2.15)	1.59
Net Income Attributable to Air Products	$13.65	$2.89	$5.88

Table of Contents

Diluted EPS attributable to Air Products reflects the potential dilution that could occur if stock options or other share-based awards were exercised or converted into common stock. The dilutive effect is computed using the treasury stock method, which assumes all share-based awards are exercised and the hypothetical proceeds from exercise are used by the Company to purchase common stock at the average market price during the period. The incremental shares (difference between shares assumed to be issued versus purchased), to the extent they would have been dilutive, are included in the denominator of the diluted EPS calculation. There were no antidilutive outstanding share-based awards in fiscal year 2017. Outstanding share-based awards of .2 million shares were antidilutive and therefore excluded from the computation of diluted EPS for 2016 and 2015.

22. INCOME TAXES

The following table summarizes the income of U.S. and foreign operations before taxes:

	2017	2016	2015
Income from Continuing Operations before Taxes			
United States	$669.8	$631.7	$507.5
Foreign	666.2	775.9	606.3
Income from equity affiliates	80.1	147.0	152.3
Total	$1,416.1	$1,554.6	$1,266.1

The following table shows the components of the provision for income taxes:

	2017	2016	2015
Current Tax Provision			
Federal	$62.8	$171.0	$117.0
State	7.0	21.2	8.1
Foreign	229.1	178.6	165.7
	298.9	370.8	290.8
Deferred Tax Provision			
Federal	1.4	45.0	1.5
State	6.0	2.8	17.8
Foreign	(45.4)	14.0	(9.9)
	(38.0)	61.8	9.4
Income Tax Provision	$260.9	$432.6	$300.2

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes. A reconciliation of the differences between the United States federal statutory tax rate and the effective tax rate is as follows:

(Percent of income before taxes)	2017	2016	2015
U.S. federal statutory tax rate	35.0 %	35.0 %	35.0 %
State taxes, net of federal benefit	1.0	1.2	1.1
Income from equity affiliates	(2.0)	(3.3)	(4.0)
Foreign tax differentials	(7.9)	(6.6)	(5.9)
U.S. taxes on foreign earnings	(2.2)	(3.1)	(2.1)
Domestic production activities	(.8)	(.8)	(1.0)
Non-deductible goodwill impairment charge	3.6	—	—
Non-U.S. subsidiary tax election	(7.7)	—	—
Business separation costs	.2	4.2	.2
Share-based compensation	(1.2)	—	—
Other	.4	1.2	.4
Effective Tax Rate	18.4 %	27.8 %	23.7 %

Table of Contents

Total company income tax payments, net of refunds, were $1,348.8 in 2017, $440.8 in 2016, and $392.9 in 2015.
Foreign tax differentials represent the differences between foreign earnings subject to foreign tax rates lower than the U.S. federal statutory tax rate of 35.0%. Foreign earnings are subject to local country tax rates that are generally below the 35.0% U.S. federal statutory rate and include tax holidays and incentives. As a result, our effective non-U.S. tax rate is typically lower than the U.S. statutory rate. If foreign pre-tax earnings increase relative to U.S. pre-tax earnings, this rate difference could increase. The jurisdictions in which we earn pre-tax earnings subject to lower foreign taxes than the U.S. statutory rate include South Korea, Taiwan, the United Kingdom, China, Canada, Spain and Belgium. As approximately 80% of the undistributed earnings are in countries with a statutory tax rate of 24% or higher, we do not generate a disproportionate amount of taxable income in countries with very low tax rates. U.S. taxes on foreign earnings are a tax benefit primarily due to foreign tax credits on the repatriation of foreign earnings to the U.S.
In 2017, the effective tax rate was impacted by a tax election made with respect to a Chilean holding company resulting in an income tax benefit of $111.4 on tax losses related to investments in Chile. The effective tax rate was also impacted by a goodwill impairment charge of $145.3 for which no tax benefits were available. See Note 10, Goodwill, for additional information regarding the impairment charge.
During the first quarter of fiscal year 2017, we adopted new accounting guidance that requires excess tax benefits and deficiencies from share-based compensation to be recognized in the income statement rather than in additional paid-in capital on the balance sheet. As a result of applying this change prospectively, we recognized $17.6 of excess tax benefits in our provision for income taxes during fiscal year 2017. See Note 2, New Accounting Guidance, for additional information.
In 2016, the effective tax rate was impacted by tax costs of $51.8 incurred in anticipation of the tax-free spin-off of Versum, primarily for a dividend declared during the third quarter of 2016 to repatriate $443.8 from a subsidiary in South Korea to the U.S. Previously, most of these foreign earnings were considered to be indefinitely reinvested. In addition, a tax benefit was not available on a significant portion of the business separation costs. See Note 4, Materials Technologies Separation, for additional information.
The significant components of deferred tax assets and liabilities are as follows:

30 September	2017	2016
Gross Deferred Tax Assets		
Retirement benefits and compensation accruals	$370.1	$527.6
Tax loss carryforwards	64.5	101.1
Tax credits and other tax carryforwards	76.1	56.0
Reserves and accruals	88.2	74.9
Partnership and other investments	—	5.8
Currency losses	20.7	—
Other	37.2	19.3
Valuation allowance	(107.7)	(165.1)
Deferred Tax Assets	549.1	619.6
Gross Deferred Tax Liabilities		
Plant and equipment	1,035.6	985.1
Currency gains	—	46.8
Unremitted earnings of foreign entities	20.9	5.4
Partnership and other investments	5.4	—
Intangible assets	81.9	91.0
Other	9.2	16.7
Deferred Tax Liabilities	1,153.0	1,145.0
Net Deferred Income Tax Liability	$603.9	$525.4

Table of Contents

Deferred tax assets and liabilities are included within the consolidated financial statements as follows:

	2017	2016
Deferred Tax Assets		
Other noncurrent assets	$174.5	$185.0
Deferred Tax Liabilities		
Deferred income taxes	778.4	710.4
Net Deferred Income Tax Liability	$603.9	$525.4

Gross federal tax credit carryforwards as of 30 September 2017 were $53.9. The federal tax carryforwards have expiration periods between 2025 and 2027. Gross state loss and tax credit carryforwards as of 30 September 2017 were $75.2 and $1.2, respectively. The state tax carryforwards have expiration periods between 2024 and 2034. Gross foreign loss and tax credit carryforwards as of 30 September 2017 were $247.3 and $21.0, respectively. Foreign tax carryforwards of $221.7 have expiration periods between 2018 and 2027; the remainder have unlimited carryforward periods.

The valuation allowance as of 30 September 2017 of $107.7, primarily related to the tax benefit of foreign loss carryforwards of $52.4 as well as foreign capital assets of $49.1 that were generated from the loss recorded on the exit from the Energy-from-Waste business in 2016. If events warrant the reversal of the valuation allowance, it would result in a reduction of tax expense. We believe it is more likely than not that future earnings and reversal of deferred tax liabilities will be sufficient to utilize our deferred tax assets, net of existing valuation allowance, at 30 September 2017. The reduction in the valuation allowances and tax loss carryforwards in 2017 was primarily due to the gain on sale of the PMD business, which resulted in the utilization of federal capital loss carryforwards as well as certain state loss carryforward balances from the prior year. See Note 3, Discontinued Operations, for additional information. This reduction was offset in part by an increase in foreign tax loss carryforwards. Retirement benefits and compensation accruals are impacted significantly by the changes in plan assets and benefit obligation that have been recognized in other comprehensive income. See Note 16, Retirement Benefits, for additional information. The repayment of a Eurobond of €300 million ($317.2) that matured on 15 March 2017, resulted in a significant reduction of the deferred tax liabilities related to currency gains.

We record U.S. income taxes on the undistributed earnings of our foreign subsidiaries and corporate joint ventures unless those earnings are indefinitely reinvested outside of the U.S. These cumulative undistributed earnings that are considered to be indefinitely reinvested in foreign subsidiaries and corporate joint ventures are included in retained earnings on the consolidated balance sheets and amounted to $6,032.5 as of 30 September 2017. An estimated $1,443.9 in U.S. income and foreign withholding taxes would be due if these earnings were remitted as dividends after payment of all deferred taxes.

A reconciliation of the beginning and ending amount of the unrecognized tax benefits is as follows:

Unrecognized Tax Benefits	2017	2016	2015
Balance at beginning of year	$90.2	$83.8	$93.1
Additions for tax positions of the current year	47.5	12.5	4.7
Additions for tax positions of prior years	16.1	2.9	3.0
Reductions for tax positions of prior years	(4.0)	—	(2.2)
Settlements	(2.0)	(5.6)	(.6)
Statute of limitations expiration	(3.2)	(2.9)	(8.3)
Foreign currency translation	1.8	(.5)	(5.9)
Balance at End of Year	$146.4	$90.2	$83.8

At 30 September 2017 and 2016, we had $146.4 and $90.2 of unrecognized tax benefits, excluding interest and penalties, of which $73.8 and $46.5, respectively, would impact the effective tax rate if recognized.

Interest and penalties related to unrecognized tax benefits are recorded as a component of income tax expense and totaled $3.7 in 2017, $1.8 in 2016, and $(1.9) in 2015. Our accrued balance for interest and penalties was $12.1 and $8.4 as of 30 September 2017 and 2016, respectively. The additions to unrecognized tax benefits in 2017 include unrecognized tax positions of $34.1 in various jurisdictions related to the sale of the PMD business and the spin-off of the EMD business. See Note 3, Discontinued Operations, and Note 4, Materials Technologies Separation, for

additional information.

Table of Contents

We are currently under examination in a number of tax jurisdictions, some of which may be resolved in the next twelve months. As a result, it is reasonably possible that a change in the unrecognized tax benefits may occur during the next twelve months. However, quantification of an estimated range cannot be made at this time.

We generally remain subject to examination in the following major tax jurisdictions for the years indicated below:

Major Tax Jurisdiction	Open Tax Years
North America	
United States	2011-2017
Canada	2013-2017
Europe	
France	2014-2017
Germany	2012-2017
Netherlands	2012-2017
Spain	2011-2017
United Kingdom	2014-2017
Asia	
China	2012-2017
South Korea	2010-2017
Taiwan	2012-2017
Latin America	
Chile	2013-2017

23. SUPPLEMENTAL INFORMATION

Other Receivables and Current Assets 30 September	2017	2016
Derivative instruments	$93.9	$169.3
Other receivables	188.0	181.7
Current capital lease receivables	93.3	88.2
Prepaid inventory	—	92.8
Other	28.1	6.2
Other receivables and current assets	$403.3	$538.2

Other Noncurrent Assets 30 September	2017	2016
Derivative instruments	$133.9	$204.4
Other long-term receivables	82.1	16.9
Prepaid tax	5.1	37.0
Deferred tax assets	174.5	185.0
Pension benefits	18.4	—
Deposits	34.8	36.5
Other	193.0	191.2
Other noncurrent assets	$641.8	$671.0

Table of Contents

Payables and Accrued Liabilities

30 September	2017	2016
Trade creditors	$659.5	$578.8
Customer advances	438.9	371.2
Accrued payroll and employee benefits	187.1	217.1
Pension and postretirement benefits	22.6	35.5
Dividends payable	207.5	186.9
Outstanding payments in excess of certain cash balances	4.5	11.9
Accrued interest expense	42.2	47.9
Derivative instruments	95.9	73.5
Severance and other costs associated with business restructuring and cost reduction actions	41.5	15.7
Other	114.6	113.7
Payables and accrued liabilities	$1,814.3	$1,652.2

Other Noncurrent Liabilities

30 September	2017	2016
Pension benefits	$703.8	$1,155.1
Postretirement benefits	57.0	74.9
Other employee benefits	99.3	104.1
Contingencies related to uncertain tax positions	130.6	78.0
Advance payments	39.0	43.8
Environmental liabilities	72.3	70.3
Derivative instruments	36.0	21.8
Asset retirement obligations	144.0	116.1
Obligation for future contribution to an equity affiliate	94.4	94.4
Obligations associated with EfW	65.3	—
Other	170.2	58.0
Other noncurrent liabilities	$1,611.9	$1,816.5

Other Income (Expense), Net

30 September	2017	2016	2015
Technology and royalty income	$20.8	$19.0	$22.8
Interest income[(A)]	1.5	6.1	4.2
Foreign exchange	4.3	(7.2)	(22.6)
Sale of assets and investments	24.3	8.8	36.3
Contract settlements	14.3	12.6	—
Transition service agreements reimbursement[(B)]	38.4	—	—
Other	17.4	10.1	4.8
Other income (expense), net	$121.0	$49.4	$45.5

(A) Beginning in the second quarter of fiscal year 2017, interest income associated with our short-term investments is reflected on the consolidated income statements in "Other non-operating income (expense), net."

(B) Reflects reimbursement for costs in support of transition services agreements with Versum for EMD and with Evonik for PMD. Refer to Note 4, Materials Technologies Separation, for additional information.

Gain on Land Sales

During the fourth quarter of 2017, we sold a parcel of land resulting in a gain of $12.2. During the fourth quarter of 2015, we sold two parcels of land resulting in a gain of $33.6. The gains are reflected in sale of assets and investments in the table above.

Table of Contents

Redeemable Noncontrolling Interest

In July 2015, we completed the purchase of an additional 30.5% equity interest in our Indura S.A. subsidiary for $277.9. We currently have a 97.8% controlling equity interest in Indura S.A. As redeemable noncontrolling interest is not part of total equity, the impacts below are excluded from our consolidated statements of equity.

The following is a summary of the changes in redeemable noncontrolling interest for the year ended 30 September 2015:

Balance at 30 September 2014	$287.2
Net income	11.5
Dividends	(2.0)
Purchase of noncontrolling interest	(277.9)
Currency translation adjustment	(18.8)
Balance at 30 September 2015	$—

Table of Contents

24. SUMMARY BY QUARTER (UNAUDITED)

These tables summarize the unaudited results of operations for each quarter of 2017 and 2016:

2017	Q1	Q2	Q3	Q4	Total
Sales	$1,882.5	$1,980.1	$2,121.9	$2,203.1	$8,187.6
Gross profit(A)	564.4	576.3	635.7	657.8	2,434.2
Business separation costs(B)	30.2	—	—	—	30.2
Business restructuring and cost reduction actions(C)	50.0	10.3	42.7	48.4	151.4
Pension settlement loss(D)	—	4.1	5.5	.9	10.5
Goodwill and intangible asset impairment charge(E)	—	—	162.1	—	162.1
Gain on land sale(F)	—	—	—	12.2	12.2
Operating income(A)	328.1	391.2	252.6	455.7	1,427.6
Equity affiliates' income (loss)	38.0	34.2	(36.9)(G)	44.8	80.1 (G)
Income tax provision (benefit)	78.4	94.5	89.3	(1.3)(H)	260.9 (H)
Net income	306.4	2,135.7	104.1	475.0	3,021.2
Net income attributable to Air Products					
Income from continuing operations	251.6	304.4	104.2	474.2	1,134.4
Income (Loss) from discontinued operations	48.2	1,825.6 (I)	(2.3)	(5.5)	1,866.0 (I)
Net income attributable to Air Products	299.8	2,130.0	101.9	468.7	3,000.4
Basic Earnings Per Common Share Attributable to Air Products					
Income from continuing operations	1.16	1.40	.48	2.17	5.20
Income (Loss) from discontinued operations	.22	8.38	(.01)	(.02)	8.56
Net income attributable to Air Products	1.38	9.78	.47	2.15	13.76
Diluted Earnings Per Common Share Attributable to Air Products					
Income from continuing operations	1.15	1.39	.47	2.15	5.16
Income (Loss) from discontinued operations	.22	8.31	(.01)	(.02)	8.49
Net income attributable to Air Products	1.37	9.70	.46	2.13	13.65
Dividends declared per common share	.86	.95	.95	.95	3.71
Market price per common share – High	150.45	149.46	147.66	152.26	
Market price per common share – Low	129.00	133.63	134.09	141.88	

Table of Contents

2016	Q1	Q2	Q3	Q4	Total
Sales	$1,866.3	$1,777.4	$1,914.5	$1,945.5	$7,503.7
Gross profit[(A)]	570.4	564.4	594.3	598.0	2,327.1
Business separation costs[(B)]	12.0	7.4	9.5	21.7	50.6
Business restructuring and cost reduction actions[(C)]	—	10.7	13.2	10.6	34.5
Pension settlement loss[(D)]	—	2.0	1.0	2.1	5.1
Operating income[(A)]	372.5	371.6	394.6	391.0	1,529.7
Equity affiliates' income	33.3	32.3	42.1	39.3	147.0
Loss on extinguishment of debt[(J)]	—	—	—	6.9	6.9
Income tax provision	96.4	93.5 [(K)]	145.9 [(K)]	96.8 [(K)]	432.6 [(K)]
Net income (loss)	372.0	(465.5)	354.1	400.9	661.5
Net income attributable to Air Products					
Income from continuing operations	280.9	278.9	250.3	289.4	1,099.5
Income (Loss) from discontinued operations	82.7	(752.2)	96.5	104.6	(468.4)
Net income (loss) attributable to Air Products	363.6	(473.3)	346.8	394.0	631.1
Basic Earnings Per Common Share Attributable to Air Products					
Income from continuing operations	1.30	1.29	1.16	1.33	5.08
Income (Loss) from discontinued operations	.38	(3.48)	.44	.48	(2.16)
Net income (loss) attributable to Air Products	1.68	(2.19)	1.60	1.81	2.92
Diluted Earnings Per Common Share Attributable to Air Products					
Income from continuing operations	1.29	1.28	1.15	1.32	5.04
Income (Loss) from discontinued operations	.38	(3.45)	.44	.48	(2.15)
Net income (loss) attributable to Air Products	1.67	(2.17)	1.59	1.80	2.89
Dividends declared per common share	.81	.86	.86	.86	3.39
Market price per common share – High	133.78	136.88	141.53	146.82	
Market price per common share – Low	117.80	106.63	124.78	127.72	

(A) Changes in estimates on projects accounted for under the percentage of completion method favorably impacted income by approximately $27 in fiscal year 2017 and $20 in fiscal year 2016, primarily during the fourth quarter. For additional information, see Note 1, Major Accounting Policies (Revenue Recognition).

(B) For additional information, see Note 4, Materials Technologies Separation.

(C) For additional information, see Note 5, Business Restructuring and Cost Reduction Actions.

(D) For additional information, see Note 16, Retirement Benefits.

(E) For additional information, see Note 10, Goodwill, and Note 11, Intangible Assets.

(F) The gain is reflected on the consolidated income statements in "Other income (expense), net." For additional information, see Note 23, Supplemental Information.

(G) Includes the impact of an other-than-temporary impairment of an investment in an equity affiliate. For additional information, see Note 8, Summarized Financial Information of Equity Affiliates.

(H) Includes the impact of a tax election benefit related to a non-U.S. subsidiary. For additional information, see Note 22, Income Taxes.

(I) Includes the after-tax gain on the sale of PMD. For additional information, see Note 3, Discontinued Operations.

(J) For additional information, see Note 15, Debt.

(K) Includes income tax expense for tax costs associated with business separation. For additional information, see Note 4, Materials Technologies Separation.

Table of Contents

25. BUSINESS SEGMENT AND GEOGRAPHIC INFORMATION

Our reporting segments reflect the manner in which our chief operating decision maker reviews results and allocates resources. Except in the Corporate and other segment, each reporting segment meets the definition of an operating segment and does not include the aggregation of multiple operating segments. Our liquefied natural gas (LNG) and helium storage and distribution sale of equipment businesses are aggregated within the Corporate and other segment.

Our reporting segments are:

- Industrial Gases – Americas
- Industrial Gases – EMEA (Europe, Middle East, and Africa)
- Industrial Gases – Asia
- Industrial Gases – Global
- Corporate and other

Industrial Gases – Regional

The regional Industrial Gases segments (Americas, EMEA, and Asia) include the results of our regional industrial gas businesses, which produce and sell atmospheric gases such as oxygen, nitrogen, and argon (primarily recovered by the cryogenic distillation of air) and process gases such as hydrogen, carbon monoxide, helium, syngas, and specialty gases. We supply gases to customers in many industries, including those in metals, glass, chemical processing, energy production and refining, food processing, metallurgical industries, medical, and general manufacturing. We distribute gases to our customers through a variety of supply modes including liquid or gaseous bulk supply delivered by tanker or tube trailer and, for smaller customers, packaged gases delivered in cylinders and dewars or small on-sites (cryogenic or non-cryogenic generators). For large-volume customers, we construct an on-site plant adjacent to or near the customer’s facility or deliver product from one of our pipelines. We are the world’s largest provider of hydrogen, which is used by refiners to facilitate the conversion of heavy crude feedstock and lower the sulfur content of gasoline and diesel fuels.

Electricity is the largest cost component in the production of atmospheric gases, and natural gas is the principal raw material for hydrogen, carbon monoxide, and syngas production. We mitigate energy and natural gas prices contractually through pricing formulas, surcharges, and cost pass-through arrangements. The regional Industrial Gases segments also include our share of the results of several joint ventures accounted for by the equity method. The largest of these joint ventures operate in Mexico, Italy, South Africa, India, Saudi Arabia, and Thailand. Each of the regional Industrial Gases segments competes against global industrial gas companies as well as regional competitors. Competition is based primarily on price, reliability of supply, and the development of industrial gas applications. We derive a competitive advantage in locations where we have pipeline networks, which enable us to provide reliable and economic supply of products to larger customers.

Industrial Gases – Global

The Industrial Gases – Global segment includes cryogenic and gas processing equipment sales for air separation. The equipment is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. The Industrial Gases – Global segment also includes centralized global costs associated with management of all the Industrial Gases segments. These costs include Industrial Gases global administrative costs, product development costs, and research and development costs. We compete with a large number of firms for all the offerings included in the Industrial Gases – Global segment. Competition in the equipment businesses is based primarily on technological performance, service, technical know-how, price, and performance guarantees.

Table of Contents

Corporate and other

The Corporate and other segment includes two ongoing global businesses (our LNG equipment business and our liquid helium and liquid hydrogen transport and storage container businesses), and corporate support functions that benefit all the segments. Competition for the two sale of equipment businesses is based primarily on technological performance, service, technical know-how, price, and performance guarantees. Corporate and other also includes income and expense that is not directly associated with the business segments, including foreign exchange gains and losses and stranded costs. Stranded costs result from functional support previously provided to the two divisions comprising the former Materials Technologies segment. The majority of these costs are reimbursed to Air Products pursuant to short-term transition services agreements under which Air Products provides transition services to Versum for EMD and to Evonik for PMD. The reimbursement for costs in support of the transition services has been reflected on the consolidated income statements within "Other income (expense), net." Refer to Note 4, Materials Technologies Separation, for additional information.

Also included are LIFO inventory adjustments, as the business segments use FIFO, and the LIFO pool adjustments are not allocated to the business segments.

In addition to assets of the global businesses included in this segment, other assets include cash, deferred tax assets, and financial instruments.

Customers

We do not have a homogeneous customer base or end market, and no single customer accounts for more than 10% of our consolidated revenues.

Accounting Policies

The accounting policies of the segments are the same as those described in Note 1, Major Accounting Policies. We evaluate the performance of segments based upon reported segment operating income.

Table of Contents

Business Segment

	Industrial Gases– Americas	Industrial Gases– EMEA	Industrial Gases– Asia	Industrial Gases– Global	Corporate and other	Segment Total
2017						
Sales to external customers	$3,637.0	$1,780.4	$1,964.7	$722.9	$82.6	$8,187.6
Operating income (loss)	950.6	387.1	531.2	71.3	(170.6)	1,769.6
Depreciation and amortization	464.4	177.1	203.2	8.9	12.2	865.8
Equity affiliates' income	58.1	47.1	53.5	.9	—	159.6
Expenditures for long-lived assets	427.2	143.2	337.8	25.6	105.9	1,039.7
Investments in net assets of and advances to equity affiliates	287.5	508.6	471.8	19.0	—	1,286.9
Total assets	5,840.8	3,276.1	4,412.1	279.6	4,648.4	18,457.0
2016						
Sales to external customers	$3,344.1	$1,704.4	$1,720.4	$498.8	$236.0	$7,503.7
Operating income (loss)	893.2	384.6	451.0	(21.3)	(87.6)	1,619.9
Depreciation and amortization	443.6	185.7	197.9	7.9	19.5	854.6
Equity affiliates' income	52.7	36.5	57.8	—	—	147.0
Expenditures for long-lived assets	406.6	159.5	313.3	6.0	22.3	907.7
Investments in net assets of and advances to equity affiliates	250.6	580.5	442.5	10.0	—	1,283.6
Total assets	5,896.7	3,178.6	4,232.7	367.6	2,384.5	16,060.1
2015						
Sales to external customers	$3,694.5	$1,866.4	$1,661.3	$286.7	$315.4	$7,824.3
Operating income (loss)	806.1	331.3	389.3	(51.6)	(86.5)	1,388.6
Depreciation and amortization	417.5	194.3	209.9	16.5	20.3	858.5
Equity affiliates' income (loss)	64.6	42.4	46.1	(.8)	—	152.3
Expenditures for long-lived assets	414.5	215.6	402.5	94.8	35.0	1,162.4
Investments in net assets of and advances to equity affiliates	249.7	564.1	421.7	14.3	—	1,249.8
Total assets	5,782.5	3,324.1	4,159.1	370.5	1,123.8	14,760.0

Below is a reconciliation of segment total operating income to consolidated operating income:

Operating Income	2017	2016	2015
Segment total	$1,769.6	$1,619.9	$1,388.6
Business separation costs	(30.2)	(50.6)	(7.5)
Business restructuring and cost reduction actions	(151.4)	(34.5)	(180.1)
Pension settlement loss	(10.5)	(5.1)	(19.3)
Goodwill and intangible asset impairment charge	(162.1)	—	—
Gain on previously held equity interest	—	—	17.9
Gain on land sales[(A)]	12.2	—	33.6
Consolidated Total	$1,427.6	$1,529.7	$1,233.2

[(A)] Reflected on the consolidated income statements in “Other income (expense), net.”

Table of Contents

Below is a reconciliation of segment total equity affiliates' income to consolidated equity affiliates' income:

Equity Affiliates' Income	2017	2016	2015
Segment total	$159.6	$147.0	$152.3
Equity method investment impairment charge	(79.5)	—	—
Consolidated Total	$80.1	$147.0	$152.3

Below is a reconciliation of segment total assets to consolidated total assets:

Total Assets	2017	2016	2015
Segment total	$18,457.0	$16,060.1	$14,760.0
Discontinued operations	10.2	1,968.5	2,556.6
Consolidated Total	$18,467.2	$18,028.6	$17,316.6

The sales information noted above relates to external customers only. All intersegment sales are eliminated in consolidation. The Industrial Gases – Global segment had intersegment sales of $239.0 in 2017, $232.4 in 2016, and $242.8 in 2015. These sales are generally transacted at market pricing. For all other segments, intersegment sales are not material for all periods presented. Equipment manufactured for our regional industrial gases segments are generally transferred at cost and not reflected as an intersegment sale.

Geographic Information

Sales to External Customers	2017	2016	2015
United States	$2,886.8	$2,911.7	$3,369.8
Europe, including Middle East	2,478.5	2,186.5	1,989.2
Asia, excluding China and India	849.6	721.4	736.8
China	1,143.4	1,020.4	957.8
Other[A]	829.3	663.7	770.7
Total	$8,187.6	$7,503.7	$7,824.3

Long-Lived Assets[B]	2017	2016	2015
United States	$3,407.4	$3,411.4	$3,502.9
Europe, including Middle East	1,279.0	1,292.5	1,379.8
Asia, excluding China and India	778.5	707.0	627.1
China	1,737.9	1,675.8	1,682.8
Other[A]	1,237.4	1,173.0	1,044.7
Total	$8,440.2	$8,259.7	$8,237.3

(A) Includes Canada, Latin America, and India.

(B) Long-lived assets include plant and equipment, net.

Geographic information is based on country of origin. Included in United States revenues are export sales to third party customers of $64.2 in 2017, $134.9 in 2016, and $231.5 in 2015.

Table of Contents

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable

ITEM 9A. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

We maintain a comprehensive set of disclosure controls and procedures (as defined in Rules 13a-15 (e) and 15d-15 (e) under the Exchange Act). Under the supervision of the Chief Executive Officer and Chief Financial Officer, the Company's management conducted an evaluation of the effectiveness of the Company's disclosure controls and procedures as of 30 September 2017. Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that, as of 30 September 2017, the disclosure controls and procedures were effective.

Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act). Management has evaluated the effectiveness of its internal control over financial reporting as of 30 September 2017 based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on that evaluation, management concluded that, as of 30 September 2017, the Company's internal control over financial reporting was effective. Management's Report on Internal Control over Financial Reporting is provided under Part II, Item 8, of this Form 10-K.

There was no change in the Company's internal control over financial reporting during the fourth quarter of fiscal year 2017 that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

KPMG LLP, the Company's independent registered public accounting firm, has audited the Company's internal control over financial reporting as of 30 September 2017. The Report of the Independent Registered Public Accounting Firm is provided under Part II, Item 8, of this Form 10-K.

Transition Services Agreement

In connection with the spin-off of Versum Materials, Inc., the Company entered into a transition services agreement pursuant to which it will continue to provide information technology, systems applications, business processes, and associated internal controls to Versum to allow Versum the time to establish its own infrastructure and both companies sufficient time to physically separate their information technology applications and infrastructure. Management has established controls to mitigate the risk that personnel of either company obtain unauthorized access to the other company's data and will continue to monitor and evaluate the sufficiency of the controls. We expect all transition services to end in 2018.

ITEM 9B. OTHER INFORMATION

Not applicable

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this item relating to the Company's directors and nominees is incorporated herein by reference to the section captioned "The Board of Directors" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018. The information required by this item relating to the Company's executive officers is set forth in Item 1 of Part I of this report.

The information required by this item relating to the Company's Audit and Finance Committee and its Audit and Finance Committee Financial Expert is incorporated herein by reference to the sections captioned "Standing Committees Of The Board" and "Audit and Finance Committee" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018.

Table of Contents

The information required by this item relating to the Company's procedures regarding the consideration of candidates recommended by shareholders and a procedure for submission of such candidates is incorporated herein by reference to the section captioned "Selection of Directors" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018.

The information required by the item relating to Section 16(a) Beneficial Ownership Reporting Compliance is incorporated herein by reference to the section captioned "Section 16(a) Beneficial Ownership Reporting Compliance" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018.

The Company has adopted a Code of Conduct that applies to all employees, including the Chief Executive Officer, the Chief Financial Officer, and the Principal Accounting Officer. The Code of Conduct can be found at our website at www.airproducts.com/codeofconduct.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated herein by reference to the sections captioned "Compensation of Executive Officers" and "Compensation of Directors" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Securities Authorized for Issuance Under Equity Compensation Plans.

Equity Compensation Plan Information

The following table provides information as of 30 September 2017 about Company stock that may be issued upon the exercise of options, warrants, and rights granted to employees or members of the Board under the Company's existing equity compensation plans, including plans approved by shareholders and plans that have not been approved by shareholders in reliance on the NYSE's former treasury stock exception or other applicable exception to the Exchange's listing requirements.

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants, and rights	Weighted-average exercise price of outstanding options, warrants, and rights	Number of Securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))
Equity compensation plans approved by security holders	4,316,028 [1]	$ 85.00	4,922,382 [2]
Equity compensation plans not approved by security holders	70,304 [3]	$—	—
Total	4,386,332	$ 85.00	4,922,382

(1) Represents Long-Term Incentive Plan outstanding stock options and deferred stock units that have been granted. Deferred stock units entitle the recipient to one share of Company common stock upon vesting, which is conditioned on continued employment during a deferral period and may also be conditioned on earn-out against certain performance targets.

(2) Represents authorized shares that were available for future grants as of 30 September 2017. These shares may be used for options, deferred stock units, restricted stock, and other stock-based awards to officers, directors, and key employees. Full value awards such as restricted stock are limited to 20% of cumulative awards after 1 October 2001.

(3) This number represents deferred stock units issued under the Deferred Compensation Plan, which are purchased for the fair market value of the underlying shares of stock with eligible deferred compensation.

The Deferred Compensation Plan was not approved by shareholders. It does not require shareholder approval because participants forego compensation equal to the full market value of any share units credited under the plans.

Table of Contents

Deferred Compensation Plan—The Company's Deferred Compensation Plan is an unfunded employee retirement benefit plan available to certain of the Company's U.S.-based management and other highly compensated employees (and those of its subsidiaries) who receive awards under the Company's Annual Incentive Plan, which is the annual cash bonus plan for executives and key salaried employees of the Company and its subsidiaries. Because participants forego current compensation to "purchase" deferred stock units for full value under the Plan, it is not required to be approved by shareholders under the NYSE listing standards. Under the Plan, participants may defer a portion of base salary (elective deferrals) which cannot be contributed to the Company's Retirement Savings Plan, a 401(k) and profit-sharing plan offered to all salaried employees (RSP), because of tax limitations and earn matching contributions from the Company that they would have received if their elective deferrals had been contributed to the RSP (matching credits). In addition, participants in the Plan may defer all or a portion of their bonus awards under the Annual Incentive Plan (bonus deferrals) under the Deferred Compensation Plan. Finally, certain participants under the Plan who participate in the profit-sharing component of the RSP rather than the Company's salaried pension plans receive contribution credits under the Plan which are a percentage ranging from 4%-6%, based on their years of service, of their salary in excess of tax limitations and their bonus awards under the Annual Incentive Plan (contribution credits). The dollar amount of elective deferrals, matching credits, bonus deferrals, and contribution credits is initially credited to an unfunded account, which earns interest credits. Participants are periodically permitted while employed by the Company to irrevocably convert all or a portion of their interest-bearing account to deferred stock units in a Company stock account. Upon conversion, the Company stock account is credited with deferred stock units based on the fair market value of a share of Company stock on the date of crediting. Dividend equivalents corresponding to the number of units are credited quarterly to the interest-bearing account. Deferred stock units generally are paid after termination of employment in shares of Company stock.

The Deferred Compensation Plan was formerly known as the Supplementary Savings Plan. The name was changed in 2006 when the deferred bonus program, previously administered under the Annual Incentive Plan, was merged into this Plan.

Certain information required by this item regarding the beneficial ownership of the Company's common stock is incorporated herein by reference to the sections captioned "Persons Owning More than 5% of Air Products Stock as of September 30, 2017" and "Air Products Stock Beneficially Owned by Officers and Directors" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by this item is incorporated herein by reference to the sections captioned "Director Independence" and "Transactions with Related Persons" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this item is incorporated herein by reference to the section captioned "Independent Registered Public Accountant" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 25 January 2018.

Table of Contents

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as a part of this report:

(1) The Company’s 2017 consolidated financial statements and the Report of the Independent Registered Public Accounting Firm are included in Part II, Item 8.

Report of Independent Registered Public Accounting Firm dated 16 November 2017	57
Consolidated Income Statements for the three fiscal years ended 30 September 2017	58
Consolidated Comprehensive Income Statements for the three fiscal years ended 30 September 2017	59
Consolidated Balance Sheets as of 30 September 2017 and 2016	60
Consolidated Statements of Cash Flows for the three fiscal years ended 30 September 2017	61
Consolidated Statements of Equity for the three fiscal years ended 30 September 2017	62

(2) Financial Statement Schedules—the following additional information should be read in conjunction with the consolidated financial statements in the Company’s 2017 consolidated financial statements.

Schedule II Valuation and Qualifying Accounts for the three fiscal years ended 30 September 2017	133

All other schedules are omitted because the required matter or conditions are not present or because the information required by the Schedules is submitted as part of the consolidated financial statements and notes thereto.

(3) Exhibits—The exhibits filed as a part of this Annual Report on Form 10-K are listed in the Index to Exhibits located on page 127 of this Report.

Table of Contents

INDEX TO EXHIBITS

Exhibit No.	Description
(2)	Plan of acquisition, reorganization, arrangement, liquidation or succession.
2.1	Purchase Agreement dated as of 6 May 2016, by and between Air Products and Chemicals, Inc. and Evonik Industries. (Filed as Exhibit 2.1 to the Company's Form 8-K Report dated 6 May 2016.)
2.2	Separation Agreement dated as of 29 September 2016, by and between Air Products and Chemicals, Inc. and Versum Materials, Inc. (Filed as Exhibit 2.1 to the Company's Form 8-K Report dated 5 October 2016.)
2.3	Tax Matters Agreement dated as of 29 September 2016, by and between Air Products and Chemicals, Inc. and Versum Materials, Inc. (Filed as Exhibit 2.2 to the Company's Form 8-K Report dated 5 October 2016.)
(3)	Articles of Incorporation and By-Laws.
3.1	Amended and Restated By-Laws of the Company. (Filed as Exhibit 3.1 to the Company's Form 8-K Report dated 21 November 2014.)*
3.2	Restated Certificate of Incorporation of the Company. (Filed as Exhibit 3.2 to the Company's Form 10-K Report for the fiscal year ended 30 September 1987.)*
3.3	Amendment to the Restated Certificate of Incorporation of the Company dated 25 January 1996. (Filed as Exhibit 3.3 to the Company's Form 10-K Report for the fiscal year ended 30 September 1996.)*
3.4	Amendment to the Restated Certificate of Incorporation of the Company dated 28 January 2014. (Filed as Exhibit 10.2 to the Company's Form 10-Q Report for the quarter ended 30 June 2014.)*
(4)	Instruments defining the rights of security holders, including indentures. Upon request of the Securities and Exchange Commission, the Company hereby undertakes to furnish copies of the instruments with respect to its long-term debt.
4.1	Indenture, dated as of January 18, 1985, between the Company and The Chase Manhattan Bank (National Association), as Trustee. (Filed as Exhibit 4(a) to the Company's Registration Statement No. 33-36974.)*
4.2	Indenture, dated as of January 10, 1995, between the Company and The Bank of New York Trust Company, N.A. (formerly Wachovia Bank, National Association and initially First Fidelity Bank Company, National Association), as Trustee. (Filed as Exhibit 4(a) to the Company's Registration Statement No. 33-57357.)*
(10)	Material Contracts
10.1	1990 Deferred Stock Plan of the Company, as amended and restated effective 1 October 1989. (Filed as Exhibit 10.1 to the Company's Form 10-K Report for the fiscal year ended 30 September 1989.)*†
10.2	Annual Incentive Plan as Amended and Restated effective 1 October 2008. (Filed as Exhibit 10.7 to the Company's Form 10-Q Report for the quarter ended 31 March 2009.)*†

10.3	Stock Incentive Program of the Company effective 1 October 1996. (Filed as Exhibit 10.21 to the Company's Form 10-K Report for the fiscal year ended 30 September 2002.)*†
10.4	Amended and Restated Deferred Compensation Program for Directors, effective 25 January 2017.†

Table of Contents

Exhibit No.	Description
10.5	Amended and Restated Long-Term Incentive Plan of the Company effective 1 October 2014. (Filed as Exhibit 10.1 to the Company's Form 8-K filed on 23 September 2014.)†
10.5(a)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY 2008 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2007.)*†
10.5(b)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY 2009 Awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2008.)*†
10.5(c)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2010 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2009.)*†
10.5(d)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2011 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2010.)*†
10.5(e)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2012 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2011.)*†
10.5(f)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2013 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2012.)*†
10.5(g)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2014 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2013.)*†
10.5(h)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2015 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2014.)*†
10.5(i)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2016 awards. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 December 2015.)*†
10.5(j)	Form of Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2017 awards. (Filed as Exhibit 10.1 and 10.2 to the Company's Form 10-Q Report for the quarter ended 31 December 2016.)*†
10.6	Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 January 2016. (Filed as Exhibit 10.2 to the Company's Form 10-Q Report for the quarter ended 31 December 2015)*†
10.6(a)	

	Amendment No. 1 to the Air Products and Chemicals, Inc. Retirement Savings Plan as Amended and Restated effective 1 January 2016. (Filed as Exhibit 10.6(a) to the Company's Form 10-K report for the fiscal year ended 30 September 2016.)*†
10.6(b)	Amendment No. 2 to the Air Products and Chemicals, Inc. Retirement Savings Plan as Amended and Restated effective 3 January 2017. (Files as Exhibit 10.3 to the Company's Form 10-Q Report for the quarter ended 31 December 2016.)*†
10.6(c)	Amendment No. 3 to the Air Products and Chemicals, Inc. Retirement Savings Plan as Amended and Restated effective 27 February 2017.†

Table of Contents

Exhibit No.	Description
10.7	Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective August 1, 2014. (Filed as Exhibit 10.10 to the Company's Form 10-K Report for the fiscal year ended 30 September 2014.)*†
10.7(a)	Amendment No. 1 dated as of 30 September 2015 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.10(a) to the Company's Form 10-K Report for the fiscal year ended 30 September 2015.)†
10.7(b)	Amendment No. 2 dated as of 30 September 2016 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.7(b) to the Company's Form 10-K Report for fiscal year ended 30 September 2016.)†
10.7(c)	Amendment No. 3 dated as of 26 July 2017 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2017.†
10.8	Deferred Compensation Plan as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.11 to the Company's Form 10-K Report for the fiscal year ended 30 September 2014.)*†
10.8(a)	Amendment No. 1 dated as of 1 January 2016 to the Deferred Compensation Plan as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.3 to the Company's Form 10-Q Report for the quarter ended 31 December 2015.)†
10.8(b)	Amendment No. 2 dated as of 30 September 2016 to the Deferred Compensation Plan as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.8(b) to the Company's Form 10-K Report for fiscal year ended 30 September 2016.)*†
10.9	Revolving Credit Facility dated as of 31 March 2017 for $2,500,000,000. (Filed as Exhibit 10.1 to the Company's Form 10-Q Report for the quarter ended 31 March 2017.)*
10.10	Air Products and Chemicals, Inc. Executive Separation Program as amended effective as of 19 July 2017.
10.11	Form of Change in Control Severance Agreement for an Executive Officer. (filed as Exhibit 10.2 of the Company's Form 8-K Report dated 23 September 2014.)*†
10.12	Compensation Program for Non-Employee Directors effective 1 July 2017. (Filed as Exhibit 10.2 to the Company's Form 10-Q Report for the quarter ended 30 June 2017.)*†
10.13	Air Products and Chemicals, Inc. Corporate Executive Committee Retention Agreements effective as of 10 January 2014. (Filed as Exhibit 10.1 to the Company's Form 8-K Report dated 15 January 2014.)*†
10.14	Employment Agreement for an Executive Officer. (Filed as Exhibit 10.1 to the Company's Form 8-K filed on 18 June 2014)*†
10.15	Retirement and Retention Agreement for an Executive Officer.†
10.16	Senior Management Severance and Summary Plan Description effective as of 1 October 2017.
12	Computation of Ratios of Earnings to Fixed Charges.

14	Code of Conduct revised on 17 May 2012. (Filed as Exhibit 14 to the Company’s Form 8-K Report filed on 23 May 2012.)*
21	Subsidiaries of the registrant.
(23)	Consents of Experts and Counsel.

Table of Contents

Exhibit No.	Description
23.1	Consent of Independent Registered Public Accounting Firm.
24	Power of Attorney.
(31)	Rule 13a-14(a)/15d-14(a) Certifications.
31.1	Certification by the Principal Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification by the Principal Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
(32)	Section 1350 Certifications.
32.1	Certification by the Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.††
99.1	Description of Common Stock (Filed as Exhibit 99.1 to the Company's Form 10-K Report for the fiscal year ended 30 September 2014.)*
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema
101.CAL	XBRL Taxonomy Extension Calculation Linkbase
101.LAB	XBRL Taxonomy Extension Label Linkbase
101.PRE	XBRL Taxonomy Extension Presentation Linkbase
101.DEF	XBRL Taxonomy Extension Definition Linkbase

* Previously filed as indicated and incorporated herein by reference. Exhibits incorporated by reference are located in SEC File No. 001-04534 unless otherwise indicated.

† Indicated management contract or compensatory arrangement.

†† The certification attached as Exhibit 32.1 that accompanies this Annual Report on Form 10-K, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Air Products and Chemicals, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Form 10-K, irrespective of any general incorporation language contained in such filing.

Table of Contents

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

AIR PRODUCTS AND CHEMICALS, INC.
(Registrant)

By: /s/ M. Scott Crocco
M. Scott Crocco
Executive Vice President and Chief Financial Officer
(Principal Financial Officer)

Date: 16 November 2017

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature and Title	Date
/s/ Seifi Ghasemi (Seifi Ghasemi) Director, Chairman, President, and Chief Executive Officer (Principal Executive Officer)	16 November 2017
/s/ Russell A. Flugel (Russell A. Flugel) Vice President and Corporate Controller (Principal Accounting Officer)	16 November 2017
* (Susan K. Carter) Director	16 November 2017
* (Charles I. Cogut) Director	16 November 2017
* (Chad C. Deaton) Director	16 November 2017
* (David H. Y. Ho) Director	16 November 2017
* (Margaret G. McGlynn) Director	16 November 2017

Table of Contents

Signature and Title	Date
*	16 November 2017
(Edward L. Monser)	
Director	
*	16 November 2017
(Matthew H. Paull)	
Director	

* Mary T. Afflerbach, Vice President, Corporate Secretary, and Chief Governance Officer, by signing her name hereto, does sign this document on behalf of the above noted individuals, pursuant to a power of attorney duly executed by such individuals, which is filed with the Securities and Exchange Commission herewith.

/s/ Mary T. Afflerbach
Mary T. Afflerbach
Attorney-in-Fact

Date: 16 November 2017

Table of Contents

AIR PRODUCTS AND CHEMICALS, INC. AND SUBSIDIARIES
SCHEDULE II–VALUATION AND QUALIFYING ACCOUNTS
For the Years Ended 30 September 2017, 2016, and 2015

	Balance at Beginning of Period	Additions Charged to Expense	Additions Charged to Other Accounts	Other Changes[A]	Balance at End of Period
Year Ended 30 September 2017					
Allowance for doubtful accounts	$55	$7	$39	($7)	$94
Allowance for deferred tax assets [B]	165	6	7	(70)	108
Year Ended 30 September 2016					
Allowance for doubtful accounts	$48	$9	$13	($15)	$55
Allowance for deferred tax assets[C]	112	1	52	—	165
Year Ended 30 September 2015					
Allowance for doubtful accounts	$58	$8	$18	($36)	$48
Allowance for deferred tax assets	106	—	9	(3)	112

(A) Other changes related to allowance for doubtful accounts primarily includes write-offs of uncollectible trade receivables, net of recoveries. Other Changes also includes the impact of foreign currency translation adjustments.

(B) The decrease in the valuation allowance was primarily due to the utilization of federal and state loss carryforwards as a result of recognizing the gain on the sale of our PMD business. This benefit was recorded in discontinued operations. See Note 3, Discontinued Operations, for additional information.

(C) The increase in the valuation allowance was primarily due to the loss recorded on the exit from the Energy-from-Waste business. These costs were recorded in discontinued operations. See Note 3, Discontinued Operations, for additional information.