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AIR PRODUCTS & CHEMICALS INC /DE/

Form 10-Q

April 26, 2018

0.5false--09-30Q220182018-03-310000002969Large Accelerated FilerAIR PRODUCTS & CHEMICALS INC /DE/1000000011249455584249455584P10MP5MP3Y0MP1MP11MP5MP2Y6MP1Y8M000000080000002430000013200000000002969 2017-10-01 2018-03-31 0000002969 2018-03-31 0000002969 2018-01-01 2018-03-31 0000002969 2016-10-01 2017-03-31 0000002969 2017-01-01 2017-03-31 0000002969 2017-09-30 0000002969 2017-03-31 0000002969 2016-09-30 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:EnergyFromWasteMember 2016-10-01 2017-03-31 0000002969 us-gaap:SegmentDiscontinuedOperationsMember 2016-10-01 2017-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:PerformanceMaterialsMember 2016-10-01 2017-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:PerformanceMaterialsMember 2016-10-01 2016-12-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:EnergyFromWasteMember 2017-09-30 0000002969 us-gaap:SegmentDiscontinuedOperationsMember 2018-03-31 0000002969 us-gaap:SegmentDiscontinuedOperationsMember 2017-09-30 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:PerformanceMaterialsMember 2017-01-03 2017-01-03 0000002969 us-gaap:SegmentDiscontinuedOperationsMember 2017-10-01 2018-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:EnergyFromWasteMember 2016-10-01 2016-12-31 0000002969 us-gaap:SegmentDiscontinuedOperationsMember 2018-01-01 2018-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:EnergyFromWasteMember 2017-01-01 2017-03-31 0000002969 us-gaap:SegmentDiscontinuedOperationsMember 2017-01-01 2017-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:PerformanceMaterialsMember 2017-01-01 2017-03-31 0000002969 us-gaap:OtherNonoperatingIncomeExpenseMember apd:MaterialsTechnologiesMember 2016-10-01 2017-03-31 0000002969 apd:MaterialsTechnologiesMember 2017-10-01 2018-03-31 0000002969 apd:BusinessSeparationCostsMember apd:MaterialsTechnologiesMember 2016-10-01 2017-03-31 0000002969 apd:MaterialsTechnologiesMember 2016-10-01 2017-03-31 0000002969 apd:MaterialsTechnologiesMember 2017-01-01 2017-03-31 0000002969 us-gaap:DiscontinuedOperationsDisposedOfByMeansOtherThanSaleSpinoffMember apd:ElectronicMaterialsMember 2016-10-01 2016-10-01 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:ElectronicMaterialsMember 2016-10-01 2017-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:ElectronicMaterialsMember 2018-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:ElectronicMaterialsMember 2017-09-30 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:ElectronicMaterialsMember 2018-01-01 2018-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:ElectronicMaterialsMember 2017-10-01 2018-03-31 0000002969 us-gaap:DiscontinuedOperationsHeldForSaleOrDisposedOfBySaleMember apd:ElectronicMaterialsMember 2017-01-01 2017-03-31 0000002969 apd:CostReductionActionsMember apd:IndustrialGasesEmeaMember 2016-10-01 2017-09-30 0000002969 apd:AssetActionsMember apd:CostReductionActionsMember 2016-10-01 2017-09-30 0000002969 apd:SeveranceAndOtherBenefitsMember apd:CostReductionActionsMember 2016-10-01 2017-03-31 0000002969 apd:AssetActionsMember apd:CostReductionActionsMember 2016-10-01 2017-03-31 0000002969 apd:SeveranceAndOtherBenefitsMember apd:CostReductionActionsMember 2016-10-01 2017-09-30 0000002969 apd:CostReductionActionsMember apd:IndustrialGasesAmericasMember 2016-10-01 2017-09-30 0000002969 apd:CostReductionActionsMember apd:IndustrialGasesAsiaMember 2016-10-01 2017-09-30 0000002969 apd:CostReductionActionsMember 2016-10-01 2017-09-30 0000002969 apd:CostReductionActionsMember apd:IndustrialGasesGlobalMember 2016-10-01 2017-09-30 0000002969 apd:BusinessRealignmentAndReorganizationMember 2016-10-01 2017-09-30 0000002969 2016-10-01 2017-09-30 0000002969 apd:CostReductionActionsMember us-gaap:CorporateAndOtherMember 2016-10-01 2017-09-30

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(Mark One)

QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended 31 March 2018

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.

(Exact Name of Registrant as Specified in Its Charter)

Delaware

23-1274455

(State or Other Jurisdiction of Incorporation or Organization) (I.R.S. Employer Identification No.)

7201 Hamilton Boulevard, Allentown, Pennsylvania

18195-1501

(Address of Principal Executive Offices)

(Zip Code)

610-481-4911

(Registrant's Telephone Number, Including Area Code)

Not Applicable

(Former Name, Former Address and Former Fiscal Year, if Changed Since Last Report)

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

Indicate by check mark whether the registrant has submitted electronically 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 No

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 | <input checked="" type="checkbox"/> | Accelerated filer | <input type="checkbox"/> | Non-accelerated filer | <input type="checkbox"/> | Smaller reporting company | <input type="checkbox"/> | Emerging growth company | <input type="checkbox"/> |
| | | | | | | | | | |

(Do not check if a smaller reporting company)

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

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

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

| | |
|-----------------------------|------------------------------|
| Class | Outstanding at 31 March 2018 |
| Common Stock, \$1 par value | 219,193,653 |

AIR PRODUCTS AND CHEMICALS, INC. and Subsidiaries
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PART I. FINANCIAL INFORMATION**Item 1. Financial Statements****AIR PRODUCTS AND CHEMICALS, INC. and Subsidiaries****CONSOLIDATED INCOME STATEMENTS****(Unaudited)**

| | Three Months Ended | | Six Months Ended | |
|---|--------------------|------------------|------------------|------------------|
| | 31 March | | 31 March | |
| (Millions of dollars, except for share and per share data) | 2018 | 2017 | 2018 | 2017 |
| Sales | \$2,155.7 | \$1,980.1 | \$4,372.3 | \$3,862.6 |
| Cost of sales | 1,506.5 | 1,403.8 | 3,078.3 | 2,720.5 |
| Selling and administrative | 194.6 | 177.6 | 386.2 | 342.3 |
| Research and development | 14.5 | 14.8 | 29.1 | 29.8 |
| Business separation costs | — | — | — | 32.5 |
| Cost reduction and asset actions | — | 10.3 | — | 60.3 |
| Other income (expense), net | 15.3 | 22.0 | 37.4 | 46.7 |
| Operating Income | 455.4 | 395.6 | 916.1 | 723.9 |
| Equity affiliates' income | 43.7 | 34.2 | 57.5 | 72.2 |
| Interest expense | 30.4 | 30.5 | 60.2 | 60.0 |
| Other non-operating income (expense), net | 11.1 | 5.3 | 20.9 | 5.1 |
| Income From Continuing Operations Before Taxes | 479.8 | 404.6 | 934.3 | 741.2 |
| Income tax provision | 56.2 | 94.5 | 348.0 | 172.9 |
| Income From Continuing Operations | 423.6 | 310.1 | 586.3 | 568.3 |
| Income (Loss) From Discontinued Operations, net of tax | — | 1,825.6 | (1.0) |)1,873.8 |
| Net Income | 423.6 | 2,135.7 | 585.3 | 2,442.1 |
| Net Income Attributable to Noncontrolling Interests of Continuing Operations | 7.2 | 5.7 | 14.3 | 12.3 |
| Net Income Attributable to Air Products | \$416.4 | \$2,130.0 | \$571.0 | \$2,429.8 |
| Net Income Attributable to Air Products | | | | |
| Income from continuing operations | \$416.4 | \$304.4 | \$572.0 | \$556.0 |
| Income (Loss) from discontinued operations | — | 1,825.6 | (1.0) |)1,873.8 |
| Net Income Attributable to Air Products | \$416.4 | \$2,130.0 | \$571.0 | \$2,429.8 |
| Basic Earnings Per Common Share Attributable to Air Products | | | | |
| Income from continuing operations | \$1.90 | \$1.40 | \$2.61 | \$2.55 |
| Income from discontinued operations | — | 8.38 | — | 8.61 |
| Net Income Attributable to Air Products | \$1.90 | \$9.78 | \$2.61 | \$11.16 |
| Diluted Earnings Per Common Share Attributable to Air Products | | | | |
| Income from continuing operations | \$1.89 | \$1.39 | \$2.59 | \$2.53 |
| Income from discontinued operations | — | 8.31 | — | 8.53 |
| Net Income Attributable to Air Products | \$1.89 | \$9.70 | \$2.59 | \$11.06 |
| Weighted Average Common Shares – Basic (in millions) | 219.4 | 217.9 | 219.2 | 217.8 |
| Weighted Average Common Shares – Diluted (in millions) | 220.8 | 219.7 | 220.7 | 219.6 |
| Dividends Declared Per Common Share – Cash | \$1.10 | \$.95 | \$2.05 | \$1.81 |

The accompanying notes are an integral part of these statements.

AIR PRODUCTS AND CHEMICALS, INC. and Subsidiaries
CONSOLIDATED COMPREHENSIVE INCOME STATEMENTS
(Unaudited)

| | Three Months Ended 31 March | |
|--|--------------------------------|------------------|
| (Millions of dollars) | 2018 | 2017 |
| Net Income | \$423.6 | \$2,135.7 |
| Other Comprehensive Income, net of tax: | | |
| Translation adjustments, net of tax of (\$13.2) and (\$8.0) | 125.6 | 149.6 |
| Net gain (loss) on derivatives, net of tax of \$4.0 and (\$5.7) | 17.8 | (15.4) |
| Pension and postretirement benefits, net of tax of \$- and \$1.2 | — | 3.8 |
| Reclassification adjustments: | | |
| Currency translation adjustment | — | 49.1 |
| Derivatives, net of tax of (\$3.3) and \$2.7 | (7.5) | 5.8 |
| Pension and postretirement benefits, net of tax of \$7.9 and \$13.7 | 26.6 | 30.1 |
| Total Other Comprehensive Income | 162.5 | 223.0 |
| Comprehensive Income | 586.1 | 2,358.7 |
| Net Income Attributable to Noncontrolling Interests | 7.2 | 5.7 |
| Other Comprehensive Income Attributable to Noncontrolling Interests | 2.2 | 5.0 |
| Comprehensive Income Attributable to Air Products | \$576.7 | \$2,348.0 |
| | Six Months Ended 31 March | |
| (Millions of dollars) | 2018 | 2017 |
| Net Income | \$585.3 | \$2,442.1 |
| Other Comprehensive Income (Loss), net of tax: | | |
| Translation adjustments, net of tax of (\$19.8) and \$24.3 | 262.0 | (131.6) |
| Net gain (loss) on derivatives, net of tax of (\$1.3) and (\$16.4) | 8.3 | (25.2) |
| Pension and postretirement benefits, net of tax of \$- and \$1.2 | — | 3.8 |
| Reclassification adjustments: | | |
| Currency translation adjustment | 3.1 | 49.1 |
| Derivatives, net of tax of (\$1.6) and \$13.3 | (6.7) | 31.4 |
| Pension and postretirement benefits, net of tax of \$18.9 and \$26.6 | 49.5 | 57.5 |
| Total Other Comprehensive Income (Loss) | 316.2 | (15.0) |
| Comprehensive Income | 901.5 | 2,427.1 |
| Net Income Attributable to Noncontrolling Interests | 14.3 | 12.3 |
| Other Comprehensive Income Attributable to Noncontrolling Interests | 4.1 | 1.9 |
| Comprehensive Income Attributable to Air Products | \$883.1 | \$2,412.9 |

The accompanying notes are an integral part of these statements.

AIR PRODUCTS AND CHEMICALS, INC. and Subsidiaries
CONSOLIDATED BALANCE SHEETS
(Unaudited)

| | 31 March 2018 | 30 September 2017 |
|---|------------------|-------------------------|
| (Millions of dollars, except for share data) | | |
| Assets | | |
| Current Assets | | |
| Cash and cash items | \$3,066.9 | \$3,273.6 |
| Short-term investments | 137.0 | 404.0 |
| Trade receivables, net | 1,252.3 | 1,174.0 |
| Inventories | 339.9 | 335.4 |
| Contracts in progress, less progress billings | 98.5 | 84.8 |
| Prepaid expenses | 131.2 | 191.4 |
| Other receivables and current assets | 370.5 | 403.3 |
| Current assets of discontinued operations | — | 10.2 |
| Total Current Assets | 5,396.3 | 5,876.7 |
| Investment in net assets of and advances to equity affiliates | 1,305.6 | 1,286.9 |
| Plant and equipment, at cost | 20,522.5 | 19,547.8 |
| Less: accumulated depreciation | 11,704.8 | 11,107.6 |
| Plant and equipment, net | 8,817.7 | 8,440.2 |
| Goodwill, net | 815.0 | 721.5 |
| Intangible assets, net | 444.4 | 368.3 |
| Noncurrent capital lease receivables | 1,128.5 | 1,131.8 |
| Other noncurrent assets | 603.6 | 641.8 |
| Total Noncurrent Assets | 13,114.8 | 12,590.5 |
| Total Assets | \$18,511.1 | \$18,467.2 |
| Liabilities and Equity | | |
| Current Liabilities | | |
| Payables and accrued liabilities | \$1,551.6 | \$1,814.3 |
| Accrued income taxes | 76.6 | 98.6 |
| Short-term borrowings | 112.5 | 144.0 |
| Current portion of long-term debt | 11.6 | 416.4 |
| Current liabilities of discontinued operations | — | 15.7 |
| Total Current Liabilities | 1,752.3 | 2,489.0 |
| Long-term debt | 3,442.4 | 3,402.4 |
| Other noncurrent liabilities | 1,923.5 | 1,611.9 |
| Deferred income taxes | 699.7 | 778.4 |
| Total Noncurrent Liabilities | 6,065.6 | 5,792.7 |
| Total Liabilities | 7,817.9 | 8,281.7 |
| Commitments and Contingencies - See Note 12 | | |
| Air Products Shareholders' Equity | | |
| Common stock (par value \$1 per share; issued 2018 and 2017 - 249,455,584 shares) | 249.4 | 249.4 |
| Capital in excess of par value | 1,011.3 | 1,001.1 |
| Retained earnings | 12,966.5 | 12,846.6 |
| Accumulated other comprehensive loss | (1,535.3) | (1,847.4) |
| Treasury stock, at cost (2018 - 30,261,931 shares; 2017 - 31,109,510 shares) | (2,111.1) | (2,163.5) |
| Total Air Products Shareholders' Equity | 10,580.8 | 10,086.2 |
| Noncontrolling Interests | 112.4 | 99.3 |

| | | |
|-------------------------------------|------------|------------|
| Total Equity | 10,693.2 | 10,185.5 |
| Total Liabilities and Equity | \$18,511.1 | \$18,467.2 |

The accompanying notes are an integral part of these statements.

AIR PRODUCTS AND CHEMICALS, INC. and Subsidiaries
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)

| | Six Months Ended | |
|--|------------------|------------------|
| | 31 March | |
| (Millions of dollars) | 2018 | 2017 |
| Operating Activities | | |
| Net income | \$585.3 | \$2,442.1 |
| Less: Net income attributable to noncontrolling interests of continuing operations | 14.3 | 12.3 |
| Net income attributable to Air Products | 571.0 | 2,429.8 |
| (Income) Loss from discontinued operations | 1.0 | (1,873.8) |
| Income from continuing operations attributable to Air Products | 572.0 | 556.0 |
| Adjustments to reconcile income to cash provided by operating activities: | | |
| Depreciation and amortization | 467.9 | 417.9 |
| Deferred income taxes | (94.4) | (68.6) |
| Tax reform repatriation | 310.3 | — |
| Undistributed earnings of unconsolidated affiliates | 3.1 | (31.5) |
| Gain on sale of assets and investments | (2.4) | (6.5) |
| Share-based compensation | 22.5 | 18.5 |
| Noncurrent capital lease receivables | 47.2 | 45.4 |
| Write-down of long-lived assets associated with cost reduction actions | — | 45.7 |
| Other adjustments | 44.7 | 34.0 |
| Working capital changes that provided (used) cash, excluding effects of acquisitions and divestitures: | | |
| Trade receivables | (30.2) | (53.8) |
| Inventories | 5.5 | 20.7 |
| Contracts in progress, less progress billings | (12.2) | (5.0) |
| Other receivables | 23.2 | 118.4 |
| Payables and accrued liabilities | (260.4) | (178.6) |
| Other working capital | 13.3 | (51.4) |
| Cash Provided by Operating Activities | 1,110.1 | 861.2 |
| Investing Activities | | |
| Additions to plant and equipment | (572.5) | (532.2) |
| Acquisitions, less cash acquired | (271.4) | — |
| Investment in and advances to unconsolidated affiliates | — | (8.9) |
| Proceeds from sale of assets and investments | 34.4 | 13.5 |
| Purchases of investments | (345.7) | (1,823.2) |
| Proceeds from investments | 612.9 | 400.0 |
| Other investing activities | (2.6) | (1.6) |
| Cash Used for Investing Activities | (544.9) | (1,952.4) |
| Financing Activities | | |
| Long-term debt proceeds | .5 | 1.3 |
| Payments on long-term debt | (409.2) | (469.7) |
| Net decrease in commercial paper and short-term borrowings | (22.4) | (816.6) |
| Dividends paid to shareholders | (415.5) | (374.0) |
| Proceeds from stock option exercises | 52.7 | 19.9 |
| Other financing activities | (21.7) | (22.7) |
| Cash Used for Financing Activities | (815.6) | (1,661.8) |
| Discontinued Operations | | |
| Cash used for operating activities | (3.1) | (520.8) |
| Cash provided by investing activities | 18.6 | 3,750.6 |
| Cash provided by financing activities | — | 69.5 |
| Cash Provided by Discontinued Operations | 15.5 | 3,299.3 |

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| | | | |
|--|------------------|------------------|-------|
| Effect of Exchange Rate Changes on Cash | 28.2 | (7.8 |) |
| (Decrease) Increase in cash and cash items | (206.7 |) | 538.5 |
| Cash and Cash items – Beginning of Year | 3,273.6 | 1,330.8 | |
| Cash and Cash Items – End of Period | \$3,066.9 | \$1,869.3 | |

The accompanying notes are an integral part of these statements.

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AIR PRODUCTS AND CHEMICALS, INC. and Subsidiaries

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(Unaudited)

(Millions of dollars unless otherwise indicated, except for share and per share data)

1. BASIS OF PRESENTATION AND MAJOR ACCOUNTING POLICIES

Refer to our 2017 Form 10-K for a description of major accounting policies. There have been no significant changes to these accounting policies during the first six months of fiscal year 2018 other than those detailed in Note 2, New Accounting Guidance, under *Accounting Guidance Implemented in 2018*. Certain prior year information has been reclassified to conform to the fiscal year 2018 presentation. The notes to the interim consolidated financial statements, unless otherwise indicated, are on a continuing operations basis.

The consolidated financial statements of Air Products and Chemicals, Inc. and its subsidiaries (“we,” “our,” “us,” the “Company,” “Air Products,” or “registrant”) included herein have been prepared by us, without audit, pursuant to the rules and regulations of the Securities and Exchange Commission (SEC). Certain information and footnote disclosures normally included in financial statements prepared in accordance with U.S. generally accepted accounting principles (GAAP) have been condensed or omitted pursuant to such rules and regulations. In our opinion, the accompanying statements reflect adjustments necessary to present fairly the financial position, results of operations, and cash flows for those periods indicated and contain adequate disclosure to make the information presented not misleading. Adjustments included herein are of a normal, recurring nature unless otherwise disclosed in the notes. The interim results for the periods indicated herein, however, do not reflect certain adjustments, such as the valuation of inventories on the last-in, first-out (LIFO) cost basis, which are only finally determined on an annual basis. In order to fully understand the basis of presentation, the consolidated financial statements and related notes included herein should be read in conjunction with the financial statements and notes thereto included in our 2017 Form 10-K. Results of operations for interim periods are not necessarily indicative of the results of operations for a full year.

2. NEW ACCOUNTING GUIDANCE

Accounting Guidance Implemented in 2018

Income Taxes

In March 2018, the Financial Accounting Standards Board (FASB) issued an update for Staff Accounting Bulletin (SAB) No. 118 issued by the SEC in December 2017 related to the U.S. Tax Cuts and Jobs Act (“the Tax Act”). We adopted the SEC guidance under SAB No. 118 in the first quarter of fiscal year 2018. We continue to report the impacts of the Tax Act as provisional based on reasonable estimates as of 31 March 2018. The SEC guidance provides a one-year measurement period to complete accounting for provisional amounts. For additional details, see Note 17, Income Taxes.

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 operating income line items as other compensation costs arising from services rendered by employees during the period. The non-service costs (e.g., interest cost, expected return on plan assets, amortization of actuarial gains/losses, settlements) should be presented in the income statement outside of operating income. The amendments also allow only the service cost component to be eligible for capitalization when applicable. We early adopted this guidance during the first quarter of fiscal year 2018. The amendments have been applied retrospectively for the income statement presentation requirements and prospectively for the limit on costs eligible for capitalization. The Company applied the practical expedient to use the amounts disclosed in its retirement benefits note for the prior comparative periods as the estimation basis for applying the retrospective presentation requirements.

Prior to adoption of the guidance, we classified all net periodic benefit costs within operating costs, primarily within “Cost of sales” and “Selling and administrative” on the consolidated income statements. The line item classification changes required by the new guidance did not impact the Company’s pre-tax earnings or net income; however,

"Operating income" and "Other non-operating income (expense), net" changed by immaterial offsetting amounts.

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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. We adopted this guidance in the first quarter of fiscal year 2018. This guidance did not have an 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 will 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. We are in the process of evaluating our onsite gases, merchant gases, and sale of equipment contracts and implementing necessary changes to accounting policies, processes, controls, and systems to enable compliance with this new standard. We continue to evaluate the impact the adoption of this standard will have on our consolidated financial statements and related disclosures.

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. 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.

Credit Losses on Financial Instruments

In June 2016, the FASB issued guidance 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 guidance 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 plan to adopt this guidance in fiscal year 2019 and do not expect adoption to have a significant impact on our consolidated financial statements.

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 will 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.

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.

Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income

In February 2018, the FASB issued guidance allowing a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Act. The guidance is effective in fiscal year 2020 with early adoption permitted, including adoption in any interim period. If elected, the reclassification can be applied in either the period of adoption or retrospectively to the period of the Tax Act's enactment (i.e., our first quarter of fiscal year 2018). We are currently evaluating the adoption alternatives and the impact this guidance will have on our consolidated financial statements.

3. DISCONTINUED OPERATIONS

The results of our former Performance Materials Division (PMD) and Energy-from-Waste (EfW) segment are reflected in our consolidated financial statements as discontinued operations.

During the second quarter of fiscal year 2017, we completed the sale of PMD to Evonik Industries AG (Evonik) for \$3.8 billion in cash. A gain of \$2,870 (\$1,833 after-tax, or \$8.34 per share) was recognized on the sale, which closed on 3 January 2017.

In fiscal year 2016, we discontinued efforts to start up and operate two EfW projects located in Tees Valley, United Kingdom. During the first quarter of fiscal year 2017, we recorded a loss on disposal of \$59.3 (\$47.1 after-tax), primarily for land lease obligations and to update our estimate of the net realizable value of the plant assets. The loss on disposal was recorded as a component of discontinued operations while the liability associated with land lease obligations was and continues to be recorded in continuing operations. The liability recorded in continuing operations was approximately \$68 as of 31 March 2018.

Summarized Financial Information of Discontinued Operations

For the three and six months ended 31 March 2018, the loss from discontinued operations, net of tax, on the consolidated income statements was \$0.0 and \$1.0, respectively. The year-to-date loss is related to EfW project exit activities and administrative costs.

The following table details the businesses and major line items that comprise income from discontinued operations, net of tax, on the consolidated income statements for the three and six months ended 31 March 2017:

| | Three Months Ended 31 March 2017 | | |
|---|-------------------------------------|---------------------------------|-------------------------------------|
| | Performance Materials | Energy- Waste ^(A) | Total Discontinued Operations |
| Cost of sales | \$3.3 | \$3.0 | \$6.3 |
| Selling and administrative | 2.1 | — | 2.1 |
| Other income (expense), net | .7 | (.4) | .3 |
| Income (Loss) Before Taxes | (4.7) | (3.4) | (8.1) |
| Income tax benefit | (.3) | (.9) | (1.2) |
| Income (Loss) From Operations of Discontinued Operations, net of tax | (4.4) | (2.5) | (6.9) |
| Gain on Disposal, net of tax | 1,832.5 | — | 1,832.5 |
| Income (Loss) From Discontinued Operations, net of tax | \$1,828.1 | (\$2.5) | \$1,825.6 |
| | Six Months Ended 31 March 2017 | | |
| | Performance Materials | Energy- Waste ^(A) | Total Discontinued Operations |
| Sales | \$254.8 | \$— | \$254.8 |
| Cost of sales | 182.3 | 9.6 | 191.9 |
| Selling and administrative | 22.5 | .2 | 22.7 |
| Research and development | 5.1 | — | 5.1 |
| Other income (expense), net | .3 | (.1) | .2 |
| Operating Income (Loss) | 45.2 | (9.9) | 35.3 |
| Equity affiliates' income | .3 | — | .3 |
| Income (Loss) Before Taxes | 45.5 | (9.9) | 35.6 |
| Income tax benefit ^(B) | (50.8) | (2.0) | (52.8) |
| Income (Loss) From Operations of Discontinued Operations, net of tax | 96.3 | (7.9) | 88.4 |
| Gain (Loss) on Disposal, net of tax | 1,832.5 | (47.1) | 1,785.4 |
| Income (Loss) From Discontinued Operations, net of tax | \$1,928.8 | (\$55.0) | \$1,873.8 |

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

As a result of the expected gain on the sale of PMD, we released valuation allowances related to capital loss and net operating loss

^(B) carryforwards during the first quarter of 2017 that favorably impacted our income tax provision within discontinued operations by approximately \$66.

There were no assets or liabilities presented in discontinued operations on the consolidated balance sheets as of 31 March 2018. Current assets of discontinued operations on the consolidated balance sheets of \$10.2 as of 30 September 2017 related to EfW. Current liabilities of discontinued operations on the consolidated balance sheets of \$15.7 as of 30 September 2017 primarily related to reserves associated with the disposition of PMD.

4. MATERIALS TECHNOLOGIES SEPARATION

In fiscal year 2017, we completed the separation of the divisions comprising the former Materials Technologies segment. As further discussed below, we completed the separation of the Electronic Materials Division (EMD) through the spin-off of Versum Materials, Inc. (Versum). For information on the disposition of PMD, refer to Note 3, Discontinued Operations.

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. The spin-off of Versum was treated as a noncash transaction in the consolidated statements of cash flows in fiscal year 2017. There has been no activity in discontinued operations on the consolidated income statements and no assets or liabilities presented in discontinued operations on the consolidated balance sheets related to EMD for the periods presented.

Business Separation Costs

In connection with the dispositions of EMD and PMD, we incurred net separation costs of \$30.2 for the six months ended 31 March 2017. No business separation costs were incurred during the second quarter of fiscal year 2017. The net costs include legal and advisory fees of \$32.5, which are reflected on the consolidated income statements as "Business separation costs," and a pension settlement benefit of \$2.3 that is now presented within "Other non-operating income (expense), net" as a result of the adoption of pension guidance at the beginning of fiscal year 2018. Refer to Note 2, New Accounting Guidance, for additional information.

No business separation costs were incurred during fiscal year 2018.

5. COST REDUCTION AND ASSET ACTIONS

For the three months ended 31 March 2017, we recognized an expense of \$10.3 for severance and other benefits related to cost reduction actions. For the six months ended 31 March 2017, we recognized a net expense of \$60.3, which included \$45.7 for asset actions and \$18.0 for severance and other benefits. These expenses were partially offset by the favorable settlement of the remaining accrual from prior year actions discussed below.

In fiscal year 2017, we recognized a net expense of \$151.4. The net expense included a charge of \$154.8 for actions taken during fiscal year 2017, including asset actions of \$88.5 and severance and other benefits of \$66.3, partially offset by the favorable settlement of the remaining \$3.4 accrued balance associated with business restructuring actions taken in 2015. 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. The charges we record for cost reduction and asset actions have been excluded from segment operating income. The following table summarizes the carrying amount of the accrual for cost reduction and asset actions at 31 March 2018:

| | Severance and Other Benefits | Asset Actions/Other | Total |
|--|---------------------------------|------------------------|---------|
| 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 |
| Amount reflected in pension liability | (.4) | — | (.4) |

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| | | | |
|---------------------------------|--------|-------|-----------|
| Cash expenditures | (23.9 |) (.2 |) (24.1) |
| Currency translation adjustment | .7 | — | .7 |
| 31 March 2018 | \$17.0 | \$.7 | \$17.7 |

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6. BUSINESS COMBINATIONS

During the first half of fiscal year 2018, we completed five acquisitions with an aggregate purchase price, net of cash acquired, of \$281.0. The largest acquisition was completed during the first quarter of fiscal year 2018 and consists primarily of three air separation units serving onsite and merchant customers in China. This acquisition is expected to strengthen our position in the region. The results of this business are consolidated within our Industrial Gases – Asia segment.

The 2018 acquisitions resulted in the recognition of \$168.9 of plant and equipment, \$62.9 of goodwill, \$3.0 of which is deductible for tax purposes, and \$65.3 of intangible assets, primarily customer relationships, having a weighted-average useful life of twelve years. The goodwill recognized on the transactions is attributable to expected growth and cost synergies and was recorded in the Industrial Gases – Asia and the Industrial Gases – EMEA segments. These acquisitions did not materially impact our consolidated income statements for the periods presented.

Subsequent Event

On 10 September 2017, Air Products signed an agreement to form a joint venture, Air Products Lu'an (Changzhi) Co., Ltd. ("the JV") with Lu'an Clean Energy Company ("Lu'an"). The JV will receive coal, steam and power from Lu'an and will supply syngas to Lu'an under a long-term onsite contract. On 26 April 2018, we completed the formation of the JV, which Air Products will consolidate and of which Air Products owns 60% and Lu'an owns 40%. Air Products contributed four large air separation units to the JV having a carrying value of approximately \$300. In addition, on 26 April 2018 ("the acquisition date"), the JV acquired gasification and syngas clean-up assets from Lu'an ("the acquisition"). In connection with the closing of the acquisition, we paid cash of approximately 1.7 billion RMB (approximately \$270) and expect to make a final payment of approximately 1.5 billion RMB (approximately \$230 as of 26 April 2018) in the fourth quarter of 2018.

The transaction will be accounted for as a business combination. The JV will be consolidated within the results of the Industrial Gases – Asia segment following the acquisition date. The initial accounting for the business combination is incomplete as of the date of this report. In total, we expect the carrying value of the plant and equipment of the joint venture to be approximately \$1.3 billion, subject to the completion of an asset valuation.

7. INVENTORIES

The components of inventories are as follows:

| | 31 March 2018 | 30 September 2017 |
|--|---------------------|----------------------|
| Finished goods | \$134.3 | \$120.0 |
| Work in process | 16.1 | 15.7 |
| Raw materials, supplies and other | 213.6 | 223.0 |
| Total FIFO cost | \$364.0 | \$358.7 |
| Less: Excess of FIFO cost over LIFO cost | (24.1) | (23.3) |
| Inventories | \$339.9 | \$335.4 |

First-in, first-out (FIFO) cost approximates replacement cost.

8. GOODWILL

Changes to the carrying amount of consolidated goodwill by segment for the six months ended 31 March 2018 are as follows:

| | Industrial Gases— Americas | Industrial Gases— EMEA | Industrial Gases— Asia | Industrial Gases— Global | Total |
|------------------------------------|----------------------------------|------------------------------|------------------------------|--------------------------------|---------|
| Goodwill, net at 30 September 2017 | \$163.7 | \$402.4 | \$135.2 | \$20.2 | \$721.5 |
| Acquisitions | — | 27.7 | 35.2 | — | 62.9 |
| Currency translation | 3.5 | 22.0 | 5.0 | .1 | 30.6 |
| Goodwill, net at 31 March 2018 | \$167.2 | \$452.1 | \$175.4 | \$20.3 | \$815.0 |
| | 31 March 2018 | 30 September 2017 | | | |
| Goodwill, gross | \$1,257.0 | \$1,138.7 | | | |
| Accumulated impairment losses | (442.0) | (417.2) | | | |
| Goodwill, net | \$815.0 | \$721.5 | | | |

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.

The accumulated impairment losses of \$442.0 as of 31 March 2018 are attributable to LASA within the Industrial Gases –Americas segment and include impairment charges recorded in previous years as well as the impacts of currency translation on the losses.

9. 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 seek 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 31 March 2018 is 2.0 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. The primary objective of these forward exchange contracts is to protect the value of foreign currency-denominated monetary assets and liabilities, primarily working capital, from the effects of volatility in foreign exchange rates that might occur prior to their receipt or settlement. This portfolio of forward exchange contracts comprises 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:

| | 31 March 2018 | | 30 September 2017 | |
|---|------------------|------------------------|-------------------|------------------------|
| | US\$ Notional | Years Average Maturity | US\$ Notional | Years Average Maturity |
| Forward Exchange Contracts: | | | | |
| Cash flow hedges | \$2,953.8 | .4 | \$3,150.2 | .4 |
| Net investment hedges | 369.5 | 2.5 | 675.5 | 3.0 |
| Not designated | 990.0 | 1.7 | 273.8 | .1 |
| Total Forward Exchange Contracts | \$4,313.3 | .9 | \$4,099.5 | .8 |

The notional value of forward exchange contracts not designated increased from the prior year. As a result of changes in our currency exposures, we de-designated a portion of forward exchange contracts previously designated as net investment hedges. To eliminate any future earnings impact of the de-designated portion, we entered into equal and offsetting forward exchange contracts.

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 €914.6 million (\$1,127.1) at 31 March 2018 and €912.2 million (\$1,077.7) at 30 September 2017. 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 31 March 2018, 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 non-functional 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:

| | 31 March 2018 | | | | 30 September 2017 | | | |
|---|---------------|---------------|-------------------|------------------------|-------------------|---------------|-------------------|------------------------|
| | US\$ Notional | Average Pay % | Average Receive % | Years Average Maturity | US\$ Notional | Average Pay % | Average Receive % | Years Average Maturity |
| Interest rate swaps (fair value hedge) | \$400.0 | LIBOR | 2.53 % | 1.4 | \$600.0 | LIBOR | 2.28 % | 1.3 |
| Cross currency interest rate swaps (net investment hedge) | \$688.7 | 3.73 % | 2.76 % | 2.3 | \$539.7 | 3.27 % | 2.59 % | 1.9 |
| Cross currency interest rate swaps (cash flow hedge) | \$1,014.6 | 5.01 % | 2.75 % | 2.4 | \$1,095.7 | 4.96 % | 2.78 % | 2.4 |
| Cross currency interest rate swaps (not designated) | \$39.5 | 3.16 % | 2.88 % | 1.5 | \$41.6 | 3.28 % | 2.32 % | 1.7 |

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

| | Balance Sheet Location | 31 | 30 | Balance Sheet Location | 31 | 30 |
|--|-------------------------|------------|----------------|------------------------------|------------|----------------|
| | | March 2018 | September 2017 | | March 2018 | September 2017 |
| Derivatives Designated as Hedging Instruments: | | | | | | |
| Forward exchange contracts | Other receivables | \$81.7 | \$81.7 | Accrued liabilities | \$31.6 | \$82.0 |
| Interest rate management contracts | Other receivables | 5.5 | 11.1 | Accrued liabilities | 19.4 | 10.7 |
| Forward exchange contracts | Other noncurrent assets | 9.1 | 27.1 | Other noncurrent liabilities | 19.7 | 13.8 |
| Interest rate management contracts | Other noncurrent assets | 43.5 | 102.6 | Other noncurrent liabilities | 58.1 | 22.2 |
| Total Derivatives Designated as Hedging Instruments | | \$139.8 | \$222.5 | | \$128.8 | \$128.7 |
| Derivatives Not Designated as Hedging Instruments: | | | | | | |
| Forward exchange contracts | Other receivables | \$4.4 | \$1.1 | Accrued liabilities | \$5.4 | \$2.2 |
| Interest rate management contracts | Other receivables | — | — | Accrued liabilities | .4 | 1.0 |
| Forward exchange contracts | Other noncurrent assets | 9.5 | — | Other noncurrent liabilities | 17.0 | — |
| Interest rate management contracts | Other noncurrent assets | 3.9 | 4.2 | Other noncurrent liabilities | — | — |
| Total Derivatives Not Designated as Hedging Instruments | | \$17.8 | \$5.3 | | \$22.8 | \$3.2 |
| Total Derivatives | | \$157.6 | \$227.8 | | \$151.6 | \$131.9 |

Refer to Note 10, Fair Value Measurements, which defines fair value, describes the method for measuring fair value, and provides additional disclosures regarding fair value measurements.

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:

| | Three Months Ended 31 March | | | | | | | |
|--|-----------------------------|---------|-----------------------|---------|----------------------|----------|----------|----------|
| | Forward Exchange Contracts | | Foreign Currency Debt | | Other ^(A) | | Total | |
| | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 |
| Cash Flow Hedges, net of tax: | | | | | | | | |
| Net gain (loss) recognized in OCI (effective portion) | \$31.9 | \$11.1 | \$— | \$— | (\$14.1) | (\$26.5) | \$17.8 | (\$15.4) |
| Net (gain) loss reclassified from OCI to sales/cost of sales (effective portion) | 4.0 | 1.2 | — | — | — | — | 4.0 | 1.2 |
| Net (gain) loss reclassified from OCI to other income (expense), net (effective portion) | (29.3) | (10.8) | — | — | 15.8 | 15.8 | (13.5) | 5.0 |
| Net (gain) loss reclassified from OCI to interest expense (effective portion) | 1.6 | (1.6) | — | — | .7 | .7 | 2.3 | (.9) |
| Net (gain) loss reclassified from OCI to other income (expense), net (ineffective portion) | (.3) | .5 | — | — | — | — | (.3) | .5 |
| Fair Value Hedges: | | | | | | | | |
| Net gain (loss) recognized in interest expense ^(B) | \$— | \$— | \$— | \$— | (\$3.6) | (\$2.8) | (\$3.6) | (\$2.8) |
| Net Investment Hedges, net of tax: | | | | | | | | |
| Net gain (loss) recognized in OCI | (\$15.2) | (\$.8) | (\$22.2) | (\$7.8) | (\$23.3) | (\$6.5) | (\$60.7) | (\$15.1) |
| Derivatives Not Designated as Hedging Instruments: | | | | | | | | |
| Net gain (loss) recognized in other income (expense), net ^(C) | \$1.6 | (\$2.5) | \$— | \$— | (\$2.2) | (\$.6) | (\$.6) | (\$3.1) |

| | Six Months Ended 31 March | | | | | | | |
|--|----------------------------|----------|-----------------------|--------|----------------------|----------|----------|----------|
| | Forward Exchange Contracts | | Foreign Currency Debt | | Other ^(A) | | Total | |
| | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 |
| Cash Flow Hedges, net of tax: | | | | | | | | |
| Net gain (loss) recognized in OCI (effective portion) | \$39.4 | (\$48.3) | \$— | \$— | (\$31.1) | \$23.1 | \$8.3 | (\$25.2) |
| Net (gain) loss reclassified from OCI to sales/cost of sales (effective portion) | 5.0 | 5.8 | — | — | — | — | 5.0 | 5.8 |
| Net (gain) loss reclassified from OCI to other income (expense), net (effective portion) | (46.9) | 38.7 | — | — | 32.2 | (12.4) | (14.7) | 26.3 |
| Net (gain) loss reclassified from OCI to interest expense (effective portion) | 2.2 | (2.4) | — | — | 1.3 | 1.4 | 3.5 | (1.0) |
| Net (gain) loss reclassified from OCI to other income (expense), net (ineffective portion) | (.5) | .3 | — | — | — | — | (.5) | .3 |
| Fair Value Hedges: | | | | | | | | |
| Net gain (loss) recognized in interest expense ^(B) | \$— | \$— | \$— | \$— | (\$6.8) | (\$11.9) | (\$6.8) | (\$11.9) |
| Net Investment Hedges, net of tax: | | | | | | | | |
| Net gain (loss) recognized in OCI | (\$22.7) | \$27.1 | (\$39.5) | \$34.0 | (\$34.5) | \$6.6 | (\$96.7) | \$67.7 |
| Derivatives Not Designated as Hedging Instruments: | | | | | | | | |
| Net gain (loss) recognized in other income (expense), net ^(C) | \$1 | (\$.4) | \$— | \$— | (\$3.5) | \$.2 | (\$3.4) | (\$.2) |

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

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- (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 non-functional currencies.

The amount of cash flow hedges' unrealized gains and losses at 31 March 2018 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 \$116.9 as of 31 March 2018 and \$34.6 as of 30 September 2017. Because our current credit rating is above the various pre-established thresholds, no collateral has been posted on these liability positions.

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 \$70.9 as of 31 March 2018 and \$138.5 as of 30 September 2017. No financial institution is required to post collateral at this time as all have credit ratings at or above threshold.

10. 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 primarily include time deposits and treasury securities 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 31 March 2018 and 30 September 2017, 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 9, Financial Instruments, for a description of derivative instruments, including details on the balance

sheet line classifications.

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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.

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

| | 31 March 2018 | | 30 September 2017 | |
|---|----------------|------------|-------------------|------------|
| | Carrying Value | Fair Value | Carrying Value | Fair Value |
| Assets | | | | |
| Derivatives | | | | |
| Forward exchange contracts | \$104.7 | \$104.7 | \$109.9 | \$109.9 |
| Interest rate management contracts | 52.9 | 52.9 | 117.9 | 117.9 |
| Liabilities | | | | |
| Derivatives | | | | |
| Forward exchange contracts | \$73.7 | \$73.7 | \$98.0 | \$98.0 |
| Interest rate management contracts | 77.9 | 77.9 | 33.9 | 33.9 |
| Long-term debt, including current portion | 3,454.0 | 3,459.5 | 3,818.8 | 3,928.2 |

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:

| | 31 March 2018 | | | | 30 September 2017 | | | |
|------------------------------------|---------------|---------|---------|---------|-------------------|---------|---------|---------|
| | Total | Level 1 | Level 2 | Level 3 | Total | Level 1 | Level 2 | Level 3 |
| Assets at Fair Value | | | | | | | | |
| Derivatives | | | | | | | | |
| Forward exchange contracts | \$104.7 | \$— | \$104.7 | \$— | \$109.9 | \$— | \$109.9 | \$— |
| Interest rate management contracts | 52.9 | — | 52.9 | — | 117.9 | — | 117.9 | — |
| Total Assets at Fair Value | \$157.6 | \$— | \$157.6 | \$— | \$227.8 | \$— | \$227.8 | \$— |
| Liabilities at Fair Value | | | | | | | | |
| Derivatives | | | | | | | | |
| Forward exchange contracts | \$73.7 | \$— | \$73.7 | \$— | \$98.0 | \$— | \$98.0 | \$— |
| Interest rate management contracts | 77.9 | — | 77.9 | — | 33.9 | — | 33.9 | — |
| Total Liabilities at Fair Value | \$151.6 | \$— | \$151.6 | \$— | \$131.9 | \$— | \$131.9 | \$— |

11. RETIREMENT BENEFITS

The components of net periodic benefit cost for the defined benefit pension plans for the three and six months ended 31 March 2018 and 2017 were as follows:

| | Pension Benefits | | | |
|---|------------------|---------------|--------|---------------|
| | 2018 | | 2017 | |
| Three Months Ended 31 March | U.S. | International | U.S. | International |
| Service cost | \$6.4 | \$6.6 | \$6.9 | \$6.3 |
| Interest cost | 26.8 | 9.6 | 27.6 | 7.9 |
| Expected return on plan assets | (50.4) | (21.1) | (51.7) | (18.3) |
| Prior service cost amortization | .4 | — | .6 | (.1) |
| Actuarial loss amortization | 22.2 | 10.3 | 20.9 | 13.2 |
| Settlements | 1.5 | — | 4.1 | 4.0 |
| Curtailement | — | — | .1 | 1.8 |
| Special termination benefits | .4 | — | (.1) | .1 |
| Other | — | .1 | — | (2.2) |
| Net Periodic Benefit Cost (Total) | \$7.3 | \$5.5 | \$8.4 | \$12.7 |
| Less: Discontinued Operations | — | — | (.1) | (3.4) |
| Net Periodic Benefit Cost (Continuing Operations) | \$7.3 | \$5.5 | \$8.3 | \$9.3 |

| | Pension Benefits | | | |
|---|------------------|---------------|---------|---------------|
| | 2018 | | 2017 | |
| Six Months Ended 31 March | U.S. | International | U.S. | International |
| Service cost ^(A) | \$12.8 | \$12.9 | \$15.2 | \$13.0 |
| Interest cost | 53.5 | 18.8 | 52.5 | 15.5 |
| Expected return on plan assets | (100.8) | (41.3) | (104.4) | (36.8) |
| Prior service cost amortization | .8 | — | 1.2 | (.1) |
| Actuarial loss amortization | 43.9 | 20.3 | 47.0 | 27.1 |
| Settlements | 3.3 | — | 4.1 | 1.7 |
| Curtailement | — | — | 4.3 | (1.3) |
| Special termination benefits | .4 | — | 1.0 | .5 |
| Other | — | .6 | — | .5 |
| Net Periodic Benefit Cost (Total) | \$13.9 | \$11.3 | \$20.9 | \$20.1 |
| Less: Discontinued Operations | — | — | (.7) | (4.1) |
| Net Periodic Benefit Cost (Continuing Operations) | \$13.9 | \$11.3 | \$20.2 | \$16.0 |

^(A) Includes total service costs from discontinued operations of \$1.3 for the six months ended 31 March 2017.

As noted in Note 2, New Accounting Guidance, we early adopted guidance on the presentation of net periodic pension and postretirement benefit cost during the first quarter of fiscal year 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 non-service related costs are presented outside of operating income in "Other non-operating income (expense), net."

Service costs are primarily included in "Cost of sales" and "Selling and administrative" on our consolidated income statements. The costs capitalized in fiscal year 2018 and 2017 were not material.

For the six months ended 31 March 2018 and 2017, our cash contributions to funded pension plans and benefit payments under unfunded pension plans were \$35.9 and \$40.8, respectively. Total contributions for fiscal year 2018 are expected to be approximately \$50 to \$70. During fiscal year 2017, total contributions were \$64.1.

12. 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 \$54 at 31 March 2018) 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 \$54 at 31 March 2018) 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 33 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 31 March 2018 and 30 September 2017 included an accrual of \$81.0 and \$83.6, 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 \$80 to a reasonably possible upper exposure of \$95 as of 31 March 2018.

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 31 March 2018, \$28.2 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.

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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 have 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 consistent with our previous estimates.

PIEDMONT

At 31 March 2018, \$16.2 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 source area remediation and groundwater recovery and treatment will continue 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 31 March 2018, \$11.9 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.

Unconditional Purchase Obligations

Our unconditional purchase obligations for helium purchases were approximately \$6,500 as of 31 March 2018. The majority of these obligations occur after fiscal year 2022. Helium purchases 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-if-tendered 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.

13. SHARE-BASED COMPENSATION

We have various share-based compensation programs, which include deferred stock units, stock options, and restricted stock. During the six months ended 31 March 2018, we granted market-based and time-based deferred stock units. 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. As of 31 March 2018, there were 4,610,336 shares available for future grant under our Long-Term Incentive Plan (LTIP), which is shareholder approved.

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

| | Three Months Ended | | Six Months Ended | |
|--|--------------------|--------|------------------|--------|
| | 31 March 2018 | 2017 | 31 March 2018 | 2017 |
| Before-tax share-based compensation cost | \$10.7 | \$9.5 | \$22.5 | \$18.5 |
| Income tax benefit | (2.1) | (3.3) | (5.3) | (6.3) |
| After-tax share-based compensation cost | \$8.6 | \$6.2 | \$17.2 | \$12.2 |

Before-tax share-based compensation cost is primarily included in "Selling and administrative" on our consolidated income statements. The amount of share-based compensation cost capitalized in the first six months of fiscal year 2018 and 2017 was not material.

Deferred Stock Units

During the six months ended 31 March 2018, we granted 104,874 market-based deferred stock units. The market-based deferred stock units are earned out at the end of a performance period beginning 1 October 2017 and ending 30 September 2020, conditioned on the level of the Company's total shareholder return in relation to a defined peer group over the three-year performance period.

The market-based deferred stock units had an estimated grant-date fair value of \$202.50 per unit, which was estimated using a Monte Carlo simulation model. 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:

| | |
|-------------------------|--------|
| Expected volatility | 18.7 % |
| Risk-free interest rate | 1.9 % |
| Expected dividend yield | 2.6 % |

In addition, during the six months ended 31 March 2018, we granted 138,340 time-based deferred stock units at a weighted average grant-date fair value of \$162.12.

14. EQUITY

The following is a summary of the changes in total equity:

| | Three Months Ended 31 March | | | | | |
|--|-----------------------------|---------------------------|--------------|--------------|---------------------------|--------------|
| | 2018 | | | 2017 | | |
| | Air Products | Non-controlling Interests | Total Equity | Air Products | Non-controlling Interests | Total Equity |
| Balance at 31 December | \$10,215.3 | \$105.9 | \$10,321.2 | \$7,161.5 | \$99.6 | \$7,261.1 |
| Net income | 416.4 | 7.2 | 423.6 | 2,130.0 | 5.7 | 2,135.7 |
| Other comprehensive income | 160.3 | 2.2 | 162.5 | 218.0 | 5.0 | 223.0 |
| Dividends on common stock (per share \$1.10, \$0.95) | (241.1) |)— | (241.1) | (206.9) |)— | (206.9) |
| Dividends to noncontrolling interests | — | (2.9) | (2.9) | — | (7.5) | (7.5) |
| Share-based compensation | 10.7 | — | 10.7 | 9.5 | — | 9.5 |
| Treasury shares for stock option and award plans | 20.2 | — | 20.2 | 7.9 | — | 7.9 |
| Other equity transactions | (1.0) |)— | (1.0) | (2.6) |)— | (2.6) |
| Balance at 31 March | \$10,580.8 | \$112.4 | \$10,693.2 | \$9,317.4 | \$102.8 | \$9,420.2 |
| | Six Months Ended 31 March | | | | | |
| | 2018 | | | 2017 | | |
| | Air Products | Non-controlling Interests | Total Equity | Air Products | Non-controlling Interests | Total Equity |
| Balance at 30 September | \$10,086.2 | \$99.3 | \$10,185.5 | \$7,079.6 | \$133.8 | \$7,213.4 |
| Net income | 571.0 | 14.3 | 585.3 | 2,429.8 | 12.3 | 2,442.1 |
| Other comprehensive income (loss) | 312.1 | 4.1 | 316.2 | (16.9) |)1.9 | (15.0) |
| Dividends on common stock (per share \$2.05, \$1.81) | (449.1) |)— | (449.1) | (394.0) |)— | (394.0) |
| Dividends to noncontrolling interests | — | (10.6) | (10.6) | — | (11.7) | (11.7) |
| Share-based compensation | 21.8 | — | 21.8 | 18.5 | — | 18.5 |
| Treasury shares for stock option and award plans | 40.1 | — | 40.1 | 7.6 | — | 7.6 |
| Spin-off of Versum | — | — | — | 186.5 | (33.9) |)152.6 |
| Cumulative change in accounting principle | — | — | — | 8.8 | — | 8.8 |
| Other equity transactions | (1.3) |)5.3 | 4.0 | (2.5) |)4 | (2.1) |
| Balance at 31 March | \$10,580.8 | \$112.4 | \$10,693.2 | \$9,317.4 | \$102.8 | \$9,420.2 |

15. ACCUMULATED OTHER COMPREHENSIVE LOSS

The tables below summarize changes in accumulated other comprehensive loss (AOCL), net of tax, attributable to Air Products for the three and six months ended 31 March 2018:

| | Derivatives qualifying as hedges | Foreign currency translation adjustments | Pension and postretirement benefits | Total |
|---|--|---|---|---------------|
| Balance at 31 December 2017 | (\$61.8 |)((\$649.5 |)((\$984.3 |)((\$1,695.6) |
| Other comprehensive income before reclassifications | 17.8 | 125.6 | — | 143.4 |
| Amounts reclassified from AOCL | (7.5 |)— | 26.6 | 19.1 |
| Net current period other comprehensive income | 10.3 | 125.6 | 26.6 | 162.5 |
| Amount attributable to noncontrolling interests | (.1 |)2.3 | — | 2.2 |
| Balance at 31 March 2018 | (\$51.4 |)((\$526.2 |)((\$957.7 |)((\$1,535.3) |

| | Derivatives qualifying as hedges | Foreign currency translation adjustments | Pension and postretirement benefits | Total |
|---|--|---|---|---------------|
| Balance at 30 September 2017 | (\$53.1 |)((\$787.1 |)((\$1,007.2 |)((\$1,847.4) |
| Other comprehensive income before reclassifications | 8.3 | 262.0 | — | 270.3 |
| Amounts reclassified from AOCL | (6.7 |)3.1 | 49.5 | 45.9 |
| Net current period other comprehensive income | 1.6 | 265.1 | 49.5 | 316.2 |
| Amount attributable to noncontrolling interests | (.1 |)4.2 | — | 4.1 |
| Balance at 31 March 2018 | (\$51.4 |)((\$526.2 |)((\$957.7 |)((\$1,535.3) |

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

| | Three Months Ended 31 March 2018 | | Six Months Ended 31 March 2017 | |
|--|---|--------|---|---------|
| (Gain) Loss on Cash Flow Hedges, net of tax | | | | |
| Sales/Cost of sales | \$4.0 | \$1.2 | \$5.0 | \$5.8 |
| Other income/expense, net | (13.8 |)5.5 | (15.2 |)26.6 |
| Interest expense | 2.3 | (.9 |)3.5 | (1.0 |
| Total (Gain) Loss on Cash Flow Hedges, net of tax | (\$7.5 |)\$5.8 | (\$6.7 |)\$31.4 |
| Currency Translation Adjustment ^(A) | \$— | \$49.1 | \$3.1 | \$49.1 |
| Pension and Postretirement Benefits, net of tax ^(B) | \$26.6 | \$30.1 | \$49.5 | \$57.5 |

The 2018 impact is reflected in "Cost of sales" and relates to an equipment sale resulting from the termination of a contract in the Industrial Gases – Asia segment during the first quarter. The 2017 impact was reflected in "Income from discontinued operations, net of tax" and related to the sale of PMD during the second quarter.

The components of net periodic benefit cost reclassified out of accumulated other comprehensive loss include items such as prior service cost amortization, actuarial loss amortization, and settlements and are included in "Other non-operating income (expense), net" on the consolidated income statements. Refer to Note 11, Retirement Benefits, for additional information.

16. EARNINGS PER SHARE

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

| | Three Months Ended | | Six Months Ended | |
|---|--------------------|------------------|------------------|------------------|
| | 31 March 2018 | 2017 | 31 March 2018 | 2017 |
| Numerator | | | | |
| Income from continuing operations | \$416.4 | \$304.4 | \$572.0 | \$556.0 |
| Income (Loss) from discontinued operations | — | 1,825.6 | (1.0) | 1,873.8 |
| Net Income Attributable to Air Products | \$416.4 | \$2,130.0 | \$571.0 | \$2,429.8 |
| Denominator (in millions) | | | | |
| Weighted average common shares — Basic | 219.4 | 217.9 | 219.2 | 217.8 |
| Effect of dilutive securities | | | | |
| Employee stock option and other award plans | 1.4 | 1.8 | 1.5 | 1.8 |
| Weighted average common shares — Diluted | 220.8 | 219.7 | 220.7 | 219.6 |
| Basic Earnings Per Common Share Attributable to Air Products | | | | |
| Income from continuing operations | \$1.90 | \$1.40 | \$2.61 | \$2.55 |
| Income from discontinued operations | — | 8.38 | — | 8.61 |
| Net Income Attributable to Air Products | \$1.90 | \$9.78 | \$2.61 | \$11.16 |
| Diluted Earnings Per Common Share Attributable to Air Products | | | | |
| Income from continuing operations | \$1.89 | \$1.39 | \$2.59 | \$2.53 |
| Income from discontinued operations | — | 8.31 | — | 8.53 |
| Net Income Attributable to Air Products | \$1.89 | \$9.70 | \$2.59 | \$11.06 |

Outstanding share-based awards of .1 million shares were antidilutive and therefore excluded from the computation of diluted earnings per share for the three and six months ended 31 March 2018. For the three months ended 31 March 2017, there were no antidilutive outstanding share-based awards. Outstanding share-based awards of .1 million shares were antidilutive and therefore excluded from the computation of diluted earnings per share for the six months ended 31 March 2017.

17. INCOME TAXES

Tax Restructuring Benefit

In the second quarter of 2018, we recognized a \$38.8 tax benefit, net of reserves for uncertain tax positions, and a decrease in net deferred tax liabilities resulting from the restructuring of foreign subsidiaries.

U.S. Tax Cuts and Jobs Act

On 22 December 2017, the United States enacted the Tax Act which significantly changed existing U.S. tax laws, including a reduction in the federal corporate income tax rate from 35% to 21%, a deemed repatriation tax on unremitted foreign earnings, as well as other changes. As a result of the Tax Act, our consolidated income statements for the six months ended 31 March 2018 reflect a net expense of \$239.0 for the impacts recorded during the first quarter of fiscal year 2018. This includes an expense of \$453.0 for the cost of the deemed repatriation tax and adjustments to the future cost of repatriation from foreign investments. This expense impacted our income tax provision by \$420.5 and equity affiliate income by \$32.5 for future costs of repatriation that will be borne by an equity affiliate. In addition, the income tax provision was benefited by \$214.0 primarily from the re-measurement of our net U.S. deferred tax liabilities at the lower corporate tax rate.

The \$420.5 adjustment reflects a deemed repatriation tax of \$364.1 that is payable over eight years and \$56.4 resulting primarily from withholding taxes that were established for repatriation of foreign earnings and other impacts of the Tax Act. We expect to apply \$53.8 of existing foreign tax credits towards the \$364.1 deemed repatriation tax. Of the

remaining \$310.3 obligation, \$263.4 is recorded on our consolidated balance sheets in noncurrent liabilities.

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We are reporting the impacts of the Tax Act provisionally based upon reasonable estimates as of 31 March 2018. The impacts are not yet finalized as they are dependent on factors and analysis not yet known or fully completed, including but not limited to, the final cash balances for fiscal year 2018, further book to U.S. tax adjustments for the earnings of foreign entities, the issuance of additional guidance, as well as our ongoing analysis of the Tax Act.

As a fiscal year-end taxpayer, certain provisions of the Tax Act become effective in our fiscal year 2018 while other provisions do not become effective until fiscal year 2019. The corporate tax rate reduction is effective as of 1 January 2018 and, accordingly, reduces our 2018 fiscal year U.S. federal statutory rate to a blended rate of approximately 24.5%.

Primarily due to the net impact of the Tax Act and the restructuring benefit, our effective tax rate was 37.2% for the six months ended 31 March 2018.

Cash Paid for Taxes (Net of Cash Refunds)

On a total company basis, income tax payments, net of refunds, were \$153.7 and \$784.7 for the six months ended 31 March 2018 and 2017, respectively. The prior year includes tax payments related to the gain on the sale of the PMD business.

Unrecognized Tax Benefits

The consolidated balance sheets as of 31 March 2018 and 30 September 2017 include unrecognized tax benefits of \$156.9 and \$146.4, respectively. The increase from the prior year primarily resulted from additions for current year tax positions of \$18.7 and included uncertain tax positions from the restructuring of foreign subsidiaries and reserves for ongoing transfer pricing uncertainties. This was offset by net reductions for tax positions of prior years of \$9.7, primarily related to the settlement of U.S. federal tax audits for 2012 through 2014.

On 17 April 2018, we received a final audit settlement agreement that resolved uncertainties related to approximately \$40 of unrecognized tax benefits that were recorded as of 31 March 2018. This settlement primarily related to tax positions taken in conjunction with the disposition of our Homecare business in 2012. As a result, we expect an income tax benefit of approximately \$25, including interest, in discontinued operations during the third quarter of 2018. In addition, the settlement will result in an income tax benefit of approximately \$9, including interest, in continuing operations during the third quarter of 2018 for the release of tax reserves on other matters.

18. BUSINESS SEGMENT 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 – Americas | Industrial Gases – EMEA | Industrial Gases – Asia | Industrial Gases – Global | Corporate and other | Segment Total |
|---|-----------------------------------|-------------------------------|-------------------------------|---------------------------------|------------------------|------------------|
| Three Months Ended 31 March 2018 | | | | | | |
| Sales | \$913.2 | \$561.6 | \$557.6 | \$101.7 | \$21.6 | \$2,155.7 |
| Operating income (loss) | 222.3 | 116.7 | 148.7 | 12.1 | (44.4) | 455.4 |
| Depreciation and amortization | 122.3 | 50.7 | 62.6 | 1.9 | 2.5 | 240.0 |
| Equity affiliates' income | 16.9 | 11.1 | 15.4 | .3 | — | 43.7 |

Three Months Ended 31 March 2017

| | | | | | | |
|-------------------------------|---------|---------|---------|---------|--------|-----------|
| Sales | \$890.1 | \$414.2 | \$435.9 | \$216.5 | \$23.4 | \$1,980.1 |
| Operating income (loss) | 223.2 | 88.6 | 112.3 | 22.7 | (40.9) | 405.9 |
| Depreciation and amortization | 116.0 | 41.6 | 49.3 | 1.7 | 3.2 | 211.8 |
| Equity affiliates' income | 13.0 | 8.3 | 12.9 | — | — | 34.2 |

| | Industrial Gases – Americas | Industrial Gases – EMEA | Industrial Gases – Asia | Industrial Gases – Global | Corporate and other | Segment Total |
|---------------------------------------|-----------------------------------|-------------------------------|-------------------------------|---------------------------------|------------------------|------------------|
| Six Months Ended 31 March 2018 | | | | | | |
| Sales | \$1,823.0 | \$1,077.5 | \$1,201.2 | \$234.7 | \$35.9 | \$4,372.3 |
| Operating income (loss) | 439.5 | 221.2 | 324.2 | 21.6 | (90.4) | 916.1 |
| Depreciation and amortization | 240.1 | 99.8 | 119.4 | 3.5 | 5.1 | 467.9 |
| Equity affiliates' income | 35.5 | 24.2 | 29.6 | .7 | — | 90.0 |

Six Months Ended 31 March 2017

| | | | | | | |
|-------------------------------|-----------|---------|---------|---------|--------|-----------|
| Sales | \$1,754.0 | \$813.9 | \$874.2 | \$364.4 | \$56.1 | \$3,862.6 |
| Operating income (loss) | 446.5 | 178.6 | 230.7 | 30.9 | (70.0) | 816.7 |
| Depreciation and amortization | 227.8 | 83.8 | 96.0 | 3.7 | 6.6 | 417.9 |
| Equity affiliates' income | 27.7 | 17.8 | 26.4 | .3 | — | 72.2 |

Total Assets

| | | | | | | |
|-------------------|-----------|-----------|-----------|---------|-----------|------------|
| 31 March 2018 | \$5,915.0 | \$3,475.5 | \$4,779.1 | \$252.5 | \$4,089.0 | \$18,511.1 |
| 30 September 2017 | 5,840.8 | 3,276.1 | 4,412.1 | 279.6 | 4,648.4 | 18,457.0 |

The sales information noted above relates to external customers only. All intersegment sales are eliminated in consolidation. For the three and six months ended 31 March 2018, the Industrial Gases – Global segment had intersegment sales of \$56.0 and \$117.9, respectively. For the three and six months ended 31 March 2017, the Industrial Gases – Global segment had intersegment sales of \$61.0 and \$122.0, respectively. 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 industrial gases segments is generally transferred at cost and not reflected as an intersegment sale.

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Changes in estimates on projects accounted for under the percentage-of-completion method favorably impacted operating income by approximately \$10 and \$12 for the three months ended 31 March 2018 and 2017, respectively. 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. Sales related to this contract are included in the results of our Industrial Gases – Global segment. During the three and six months ended 31 March 2018, sales were approximately \$60 and \$150, respectively, related to this contract. During the three and six months ended 31 March 2017, sales were approximately \$170 and \$280, respectively.

Below is a reconciliation of segment total operating income to consolidated operating income:

| | Three Months Ended | | Six Months Ended | |
|----------------------------------|--------------------|----------------|------------------|----------------|
| | 31 March | | 31 March | |
| | 2018 | 2017 | 2018 | 2017 |
| Operating Income | | | | |
| Segment total | \$455.4 | \$405.9 | \$916.1 | \$816.7 |
| Business separation costs | — | — | — | (32.5) |
| Cost reduction and asset actions | — | (10.3) | — | (60.3) |
| Consolidated Total | \$455.4 | \$395.6 | \$916.1 | \$723.9 |

Below is a reconciliation of segment total equity affiliates' income to consolidated equity affiliates' income:

| | Three Months Ended | | Six Months Ended | |
|--|--------------------|---------------|------------------|---------------|
| | 31 March | | 31 March | |
| | 2018 | 2017 | 2018 | 2017 |
| Equity Affiliates' Income | | | | |
| Segment total | \$43.7 | \$34.2 | \$90.0 | \$72.2 |
| Tax reform repatriation - equity method investment | — | — | (32.5) | — |
| Consolidated Total | \$43.7 | \$34.2 | \$57.5 | \$72.2 |

Below is a reconciliation of segment total assets to consolidated total assets:

| | 31 March | | 30 September |
|---------------------------|-------------------|-------------------|--------------|
| | 2018 | 2017 | |
| Total Assets | | | |
| Segment total | \$18,511.1 | \$18,457.0 | |
| Discontinued operations | — | 10.2 | |
| Consolidated Total | \$18,511.1 | \$18,467.2 | |

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The disclosures in this quarterly report are complementary to those made in our 2017 Form 10-K. An analysis of results for the second quarter and first six months of fiscal year 2018 is provided in this Management's Discussion and Analysis.

The following discussion should be read in conjunction with the consolidated financial statements and the accompanying notes contained in this report. Unless otherwise indicated, financial information is presented on a continuing operations basis. 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. 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 43-48. Descriptions of the excluded items appear on pages 32-33 and pages 39-40.

SECOND QUARTER 2018 VS. SECOND QUARTER 2017

SECOND QUARTER 2018 IN SUMMARY

• Sales of \$2,155.7 increased 9%, or \$175.6, from higher volumes across the regional industrial gases segments of 4% and favorable currency impacts of 5%.

• Operating income of \$455.4 increased 15%, or \$59.8, and operating margin of 21.1% increased 110 basis points (bp).

• On a non-GAAP basis, adjusted operating income of \$455.4 increased 12%, or \$49.5, and adjusted operating margin of 21.1% increased 60 bp.

• Income from continuing operations of \$416.4 increased 37%, or \$112.0, and diluted earnings per share of \$1.89 increased 36%, or \$.50. On a non-GAAP basis, adjusted income from continuing operations of \$377.6 increased 20%, or \$63.4, and adjusted diluted earnings per share of \$1.71 increased 20%, or \$.28. A summary table of changes in diluted earnings per share is presented below.

• Adjusted EBITDA of \$739.1 increased 13%, or \$87.2. Adjusted EBITDA margin of 34.3% increased 140 bp.

• We increased our quarterly dividend by 16% from \$.95 to \$1.10 per share, the largest increase in Company history.

• This represents the 36th consecutive year that we have increased our dividend payment.

Changes in Diluted Earnings per Share Attributable to Air Products

| | Three Months Ended | | |
|---|--------------------|---------------|------------------------|
| | 31 March 2018 | 2017 | Increase (Decrease) |
| Diluted Earnings per Share | | | |
| Net income | \$1.89 | \$9.70 | (\$7.81) |
| Income from discontinued operations | — | 8.31 | (8.31) |
| Income from Continuing Operations – GAAP Basis | \$1.89 | \$1.39 | \$.50 |
| Operating Income Impact (after-tax) | | | |
| Underlying business | | | |
| Volume | | | \$.12 |
| Price/raw materials | | | .02 |
| Costs | | | (.06) |
| Currency | | | .09 |
| Cost reduction and asset actions | | | .03 |
| Pension settlement loss | | | .01 |
| Total Operating Income Impact (after-tax) | | | \$.21 |
| Other Impact (after-tax) | | | |
| Equity affiliates' income | | | \$.03 |
| Other non-operating income (expense), net | | | .01 |
| Noncontrolling interests | | | (.01) |
| Income tax | | | .09 |
| Tax restructuring benefit | | | .18 |
| Weighted average diluted shares | | | (.01) |
| Total Other Impact (after-tax) | | | \$.29 |
| Total Change in Diluted Earnings per Share from Continuing Operations – GAAP Basis | | | \$.50 |

| | Three Months Ended | | |
|---|--------------------|---------------|------------------------|
| | 31 March 2018 | 2017 | Increase (Decrease) |
| Income from Continuing Operations – GAAP Basis | \$1.89 | \$1.39 | \$.50 |
| Cost reduction and asset actions | — | .03 | (.03) |
| Pension settlement loss | — | .01 | (.01) |
| Tax restructuring benefit | (.18) | — | (.18) |
| Income from Continuing Operations – Non-GAAP Basis | \$1.71 | \$1.43 | \$.28 |

RESULTS OF OPERATIONS**Discussion of Consolidated Results**

| | Three Months Ended | | | | |
|-----------------------------------|--------------------|-----------|-----------|--------|---|
| | 31 March | | | | |
| | 2018 | 2017 | \$ Change | Change | |
| Sales | \$2,155.7 | \$1,980.1 | \$175.6 | 9 | % |
| Operating income | 455.4 | 395.6 | 59.8 | 15 | % |
| Operating margin | 21.1 | % 20.0 | % | 110 bp | |
| Equity affiliates' income | 43.7 | 34.2 | 9.5 | 28 | % |
| Income from continuing operations | 416.4 | 304.4 | 112.0 | 37 | % |
| Non-GAAP Basis | | | | | |
| Adjusted EBITDA | \$739.1 | \$651.9 | \$87.2 | 13 | % |
| Adjusted EBITDA margin | 34.3 | % 32.9 | % | 140 bp | |
| Adjusted operating income | 455.4 | 405.9 | 49.5 | 12 | % |
| Adjusted operating margin | 21.1 | % 20.5 | % | 60 bp | |

Sales

| | % Change from Prior Year | |
|--|-----------------------------|----------|
| Underlying business | | |
| Volume | 4 | % |
| Price | 1 | % |
| Energy and natural gas cost pass-through | (1) |)% |
| Currency | 5 | % |
| Total Consolidated Change | 9 | % |

Sales of \$2,155.7 increased 9%, or \$175.6. Underlying sales increased 5% from higher volumes of 4% and higher pricing of 1%. Volumes were higher across all regional Industrial Gases segments, primarily due to new project onstreams and acquisitions in the Industrial Gases – EMEA and Industrial Gases – Asia segments, partially offset by lower sale of equipment activity in the Industrial Gases – Global segment. The pricing improvement was largely attributable to the Industrial Gases – Asia segment, primarily driven by improved merchant pricing in China. Lower energy and natural gas cost pass-through to customers decreased sales by 1%, and favorable currency impacts, primarily from the Euro, the British Pound Sterling, and the Chinese Renminbi, increased sales by 5%.

Operating Income and Margin

Operating income of \$455.4 increased 15%, or \$59.8, due to higher volumes of \$34, favorable currency impacts of \$25, lower cost reduction and asset actions of \$10, and favorable pricing, net of energy, fuel, and raw material costs, of \$6, partially offset by unfavorable net operating costs of \$15. The increase in net operating costs was primarily driven by higher incentive compensation, lower cost reimbursement, including costs for transition services, and a legal settlement. Operating margin of 21.1% increased 110 bp, primarily due to the higher volumes.

On a non-GAAP basis, adjusted operating income of \$455.4 increased 12%, or \$49.5, primarily due to higher volumes, favorable currency impacts, and favorable pricing, net of energy, fuel, and raw material costs, partially offset by unfavorable net operating costs. Adjusted operating margin of 21.1% increased 60 bp, primarily due to the higher volumes.

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.

Adjusted EBITDA of \$739.1 increased 13%, or \$87.2, primarily due to higher volumes, favorable pricing, and favorable currency impacts. Adjusted EBITDA margin of 34.3% increased 140 bp, primarily due to higher volumes, partially offset by higher operating costs and higher energy and natural gas cost pass-through to a new hydrogen plant in India.

Equity Affiliates' Income

Equity affiliates' income of \$43.7 increased 28%, or \$9.5, primarily driven by higher volumes and favorable currency impacts.

Cost of Sales and Gross Margin

Cost of sales of \$1,506.5 increased \$102.7, or 7%, due to unfavorable currency impacts of \$65, higher costs attributable to sales volumes of \$38, and higher other costs of \$14, partially offset by lower energy and natural gas cost pass-through to customers of \$14. Gross margin of 30.1% increased 100 bp, primarily due to favorable pricing.

Selling and Administrative Expense

Selling and administrative expense of \$194.6 increased \$17.0, or 10.0%, primarily driven by unfavorable currency impacts and higher costs, including incentive compensation. For the three months ended 31 March 2018 and 2017, selling and administrative expense, as a percentage of sales, was 9.0%.

Research and Development

Research and development expense of \$14.5 decreased \$.3. For the three months ended 31 March 2018 and 2017, research and development expense, as a percentage of sales, was .7%.

Cost Reduction and Asset Actions

There were no charges recorded for cost reduction and asset actions for the three months ended 31 March 2018. For the three months ended 31 March 2017, we recognized an expense of \$10.3 (\$7.2 after-tax, or \$.03 per share) for severance and other benefits related to cost reduction actions. Refer to Note 5, Cost Reduction and Asset Actions, to the consolidated financial statements for additional details.

Other Income (Expense), Net

Other income (expense), net of \$15.3 decreased \$6.7, or 30.0%, due to lower income from transition services agreements with Versum and Evonik, partially offset by a favorable foreign exchange impact.

Interest Expense

| | Three Months Ended 31 March | |
|----------------------------|-----------------------------------|--------|
| | 2018 | 2017 |
| Interest incurred | \$34.4 | \$36.4 |
| Less: capitalized interest | 4.0 | 5.9 |
| Interest expense | \$30.4 | \$30.5 |

Interest incurred decreased \$2.0 as the impact from a lower average debt balance of \$6 was partially offset by the impact from a higher average interest rate on the debt portfolio of \$4. The change in capitalized interest was driven by a decrease in the carrying value of projects under construction.

Other Non-Operating Income (Expense), Net

Other non-operating income (expense), net of \$11.1 increased \$5.8 due to lower pension expense and higher interest income on cash and cash items. The prior year pension expense included settlement losses of \$4.1 (\$2.6 after-tax, or \$.01 per share) to accelerate recognition of a portion of actuarial losses deferred in accumulated other comprehensive loss, primarily associated with the U.S. Supplementary Pension Plan.

Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes. The effective tax rate was 11.7% and 23.4% in the second quarter of 2018 and 2017, respectively. The current year rate was lower primarily due to a tax benefit of \$38.8 that resulted from the restructuring of foreign subsidiaries, a higher tax benefit from share-based compensation, and the mix of income in jurisdictions with a lower effective tax rate. Additionally, we estimate that the lower U.S. federal statutory rate and other impacts of the Tax Act reduced our effective tax rate by approximately 2.8% for the three months ended 31 March 2018.

On a non-GAAP basis, the adjusted effective tax rate decreased from 23.7% in 2017 to 19.8% in 2018, primarily due to the impacts of the Tax Act, an increased tax benefit from share-based compensation, and the mix of income in jurisdictions with a lower effective tax rate.

Refer to Note 17, Income Taxes, to the consolidated financial statements for additional information.

Discontinued Operations

The results of our former Performance Materials Division (PMD) and Energy-from-Waste (EfW) segment are reflected in our consolidated financial statements as discontinued operations. Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information.

Segment Analysis**Industrial Gases – Americas**

| | Three Months Ended 31 March | | | |
|---------------------------|-----------------------------|---------|-----------|----------|
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$913.2 | \$890.1 | \$23.1 | 3% |
| Operating income | 222.3 | 223.2 | (.9) | —% |
| Operating margin | 24.3 % | 25.1 % | | (80 bp) |
| Equity affiliates' income | 16.9 | 13.0 | 3.9 | 30% |
| Adjusted EBITDA | 361.5 | 352.2 | 9.3 | 3% |
| Adjusted EBITDA margin | 39.6 % | 39.6 % | | — bp |

Industrial Gases – Americas Sales

| | % Change from Prior Year | |
|--|--------------------------|----------|
| Underlying business | | |
| Volume | 4 | % |
| Price | — | % |
| Energy and natural gas cost pass-through | (2) |)% |
| Currency | 1 | % |
| Total Industrial Gases – Americas | 3 | % |

Sales Change

Sales of \$913.2 increased 3%, or \$23.1. Underlying sales were up 4% from higher volumes as pricing was flat. The volume increase was primarily driven by higher hydrogen and merchant volumes. Lower energy and natural gas cost pass-through to customers decreased sales by 2%, and favorable currency impacts increased sales by 1%.

Industrial Gases – Americas Operating Income and Margin

Operating income of \$222.3 decreased \$.9, primarily due to higher costs of \$8 and lower price, net of power and fuel costs, of \$6, mostly offset by favorable volumes of \$11 and favorable currency impacts of \$2. Operating margin of 24.3% decreased 80 bp, primarily due to higher costs.

Industrial Gases – Americas Equity Affiliates' Income

Equity affiliates' income of \$16.9 increased \$3.9 due to volume growth and favorable currency impacts in our equity affiliate in Mexico.

Industrial Gases – Europe, Middle East, and Africa (EMEA)

| | Three Months Ended 31 March | | | |
|---------------------------|-----------------------------------|---------|-----------|----------|
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$561.6 | \$414.2 | \$147.4 | 36% |
| Operating income | 116.7 | 88.6 | 28.1 | 32% |
| Operating margin | 20.8 | % 21.4 | % | (60 bp) |
| Equity affiliates' income | 11.1 | 8.3 | 2.8 | 34% |
| Adjusted EBITDA | 178.5 | 138.5 | 40.0 | 29% |
| Adjusted EBITDA margin | 31.8 | % 33.4 | % | (160 bp) |

Industrial Gases – EMEA Sales

| | % Change from Prior Year | |
|---|-----------------------------|----------|
| Underlying business | | |
| Volume | 20 | % |
| Price | 1 | % |
| Energy and natural gas cost pass-through | — | % |
| Currency | 15 | % |
| Total Industrial Gases – EMEA Sales Change | 36 | % |

Sales of \$561.6 increased 36%, or \$147.4. Underlying sales were up 21% from higher volumes of 20% and higher pricing of 1%. The volume increase was primarily driven by a new hydrogen plant in India and higher merchant and onsite volumes. Energy and natural gas cost pass-through to customers was flat versus the prior year. Favorable currency impacts, primarily from the Euro and British Pound Sterling, increased sales by 15%.

Industrial Gases – EMEA Operating Income and Margin

Operating income of \$116.7 increased 32%, or \$28.1, due to favorable currency impacts of \$13, higher volumes of \$11, favorable pricing of \$3, and lower costs of \$1. Operating margin of 20.8% decreased 60 bp, primarily due to lower margins on the new hydrogen volumes in India.

Industrial Gases – EMEA Equity Affiliates' Income

Equity affiliates' income of \$11.1 increased \$2.8 primarily due to lower costs.

Industrial Gases – Asia

| | Three Months Ended 31 March | | | |
|---------------------------|-----------------------------------|---------|-----------|----------|
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$557.6 | \$435.9 | \$121.7 | 28% |
| Operating income | 148.7 | 112.3 | 36.4 | 32% |
| Operating margin | 26.7 | % 25.8 | % | 90 bp |
| Equity affiliates' income | 15.4 | 12.9 | 2.5 | 19% |
| Adjusted EBITDA | 226.7 | 174.5 | 52.2 | 30% |
| Adjusted EBITDA margin | 40.7 | % 40.0 | % | 70 bp |

Industrial Gases – Asia Sales

| | % Change from Prior Year | |
|---|-----------------------------|----------|
| Underlying business | | |
| Volume | 17 | % |
| Price | 3 | % |
| Energy and natural gas cost pass-through | — | % |
| Currency | 8 | % |
| Total Industrial Gases – Asia Sales Change | 28 | % |

Sales of \$557.6 increased 28%, or \$121.7. Underlying sales were up 20% from higher volumes of 17% and higher pricing of 3%. The volume increase was primarily driven by new plant onstreams and base merchant business growth. Merchant pricing improved across Asia driven primarily by China. Energy and natural gas cost pass-through to customers was flat versus the prior year. Favorable currency impacts, primarily from the Chinese Renminbi, South Korean Won, and Taiwan Dollar, increased sales by 8%.

Industrial Gases – Asia Operating Income and Margin

Operating income of \$148.7 increased 32%, or \$36.4, due to higher volumes of \$25, favorable price, net of power costs, of \$9, and favorable currency impacts of \$9, partially offset by higher operating costs of \$7. Operating margin of 26.7% increased 90 bp as higher volumes and favorable price, net of power costs, were partially offset by the dilutive impact of unfavorable cost performance.

Industrial Gases – Asia Equity Affiliates' Income

Equity affiliates' income of \$15.4 increased \$2.5, primarily due to higher volumes.

Industrial Gases – Global

| | Three Months Ended 31 March | | | |
|------------------|-----------------------------------|---------|------------|----------|
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$101.7 | \$216.5 | (\$114.8) | (53)% |
| Operating income | 12.1 | 22.7 | (10.6) | (47)% |
| Adjusted EBITDA | 14.3 | 24.4 | (10.1) | (41)% |

Industrial Gases – Global Sales and Operating Income

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.

Sales of \$101.7 decreased \$114.8, or 53%. The decrease in sales was primarily driven by lower sale of equipment activity on the multiple air separation units that will serve Saudi Aramco's Jazan oil refinery and power plant in Saudi Arabia.

Operating income of \$12.1 decreased \$10.6, primarily due to the lower sale of equipment activity.

Corporate and other

In addition to our liquefied natural gas (LNG) and helium storage and distribution sale of equipment businesses, the results of the Corporate and other segment include stranded costs related to the former Materials Technologies segment, which is now presented as discontinued operations. Stranded costs primarily relate to costs in support of transition services agreements with Versum and Evonik, the majority of which were reimbursed to Air Products. All transition services were substantially complete as of 31 March 2018.

| | Three Months | | | |
|-----------------|--------------|---------|-----------|----------|
| | Ended | | | |
| | 31 March | | | |
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$21.6 | \$23.4 | (\$1.8) | (8)% |
| Operating loss | (44.4) | (40.9) | (3.5) | (9)% |
| Adjusted EBITDA | (41.9) | (37.7) | (4.2) | (11)% |

Corporate and other Sales and Operating Loss

Sales of \$21.6 decreased \$1.8, primarily due to lower activity in our helium container business. Operating loss of \$44.4 increased \$3.5 due to higher project development activity.

FIRST SIX MONTHS 2018 VS. FIRST SIX MONTHS 2017**FIRST SIX MONTHS 2018 IN SUMMARY**

Sales of \$4,372.3 increased 13%, or \$509.7 from underlying sales growth of 9% and favorable currency impacts of 4%. The underlying sales growth was primarily driven by higher volumes across the regional industrial gases segments.

Operating income of \$916.1 increased 27%, or \$192.2, and operating margin of 21.0% increased 230 bp. On a non-GAAP basis, adjusted operating income of \$916.1 increased 12%, or \$99.4, and adjusted operating margin of 21.0% decreased 10 bp.

Income from continuing operations of \$572.0 increased 3%, or \$16.0, and diluted earnings per share of \$2.59 increased 2%, or \$.06. On a non-GAAP basis, adjusted income from continuing operations of \$772.2 increased 21.0%, or \$136.0, and adjusted diluted earnings per share of \$3.50 increased 21%, or \$.60. A summary table of changes in diluted earnings per share is presented below.

Adjusted EBITDA of \$1,474.0 increased 13%, or \$167.2. Adjusted EBITDA margin of 33.7% decreased 10 bp. We increased our quarterly dividend by 16% from \$.95 to \$1.10 per share, the largest increase in Company history. This represents the 36th consecutive year that we have increased our dividend payment.

Changes in Diluted Earnings per Share Attributable to Air Products

| | Six Months Ended | | |
|---|---------------------|---------------|------------------------|
| | 31 March 2018 | 2017 | Increase (Decrease) |
| Diluted Earnings per Share | | | |
| Net income | \$2.59 | \$11.06 | (\$8.47) |
| Income from discontinued operations | — | 8.53 | (8.53) |
| Income from Continuing Operations – GAAP Basis | \$2.59 | \$2.53 | \$.06 |
| Operating Income Impact (after-tax) | | | |
| Underlying business | | | |
| Volume | | | \$.31 |
| Price/raw materials | | | .10 |
| Costs | | | (.21) |
| Currency | | | .15 |
| Business separation costs | | | .12 |
| Cost reduction and asset actions | | | .23 |
| Pension settlement loss | | | .01 |
| Operating Income | | | \$.71 |
| Other (after-tax) | | | |
| Equity affiliates' income | | | .06 |
| Other non-operating income (expense), net | | | .05 |
| Income tax | | | .17 |
| Tax reform repatriation | | | (2.06) |
| Tax reform rate change and other | | | .97 |
| Tax restructuring benefit | | | .18 |
| Tax costs associated with business separation | | | .01 |
| Noncontrolling interests | | | (.01) |
| Weighted average diluted shares | | | (.02) |
| Other | | | (\$.65) |
| Total Change in Diluted Earnings per Share from Continuing Operations – GAAP Basis | | | \$.06 |

| | Six Months Ended | | |
|---|---------------------|---------------|------------------------|
| | 31 March 2018 | 2017 | Increase (Decrease) |
| Income from Continuing Operations – GAAP Basis | \$2.59 | \$2.53 | \$.06 |
| Business separation costs | — | .12 | (.12) |
| Tax costs associated with business separation | — | .01 | (.01) |
| Cost reduction and asset actions | — | .23 | (.23) |
| Pension settlement loss | — | .01 | (.01) |
| Tax reform repatriation | 2.06 | — | 2.06 |
| Tax reform rate change and other | (.97) | — | (.97) |
| Tax restructuring benefit | (.18) | — | (.18) |
| Income from Continuing Operations – Non-GAAP Basis | \$3.50 | \$2.90 | \$.60 |

RESULTS OF OPERATIONS**Discussion of Consolidated Results**

| | Six Months Ended | | | | |
|------------------------------------|------------------|-----------|-----------|--------|----|
| | 31 March | | | | |
| | 2018 | 2017 | \$ Change | Change | |
| Sales | \$4,372.3 | \$3,862.6 | \$509.7 | 13 | % |
| Operating income | 916.1 | 723.9 | 192.2 | 27 | % |
| Operating margin | 21.0 | % 18.7 | % | 230 | bp |
| Equity affiliates' income | 57.5 | 72.2 | (14.7) | (20) |)% |
| Income from continuing operations | 572.0 | 556.0 | 16.0 | 3 | % |
| Non-GAAP Basis | | | | | |
| Adjusted EBITDA | 1,474.0 | 1,306.8 | 167.2 | 13 | % |
| Adjusted EBITDA margin | 33.7 | % 33.8 | % | (10) | bp |
| Adjusted operating income | 916.1 | 816.7 | 99.4 | 12 | % |
| Adjusted operating margin | 21.0 | % 21.1 | % | (10) | bp |
| Adjusted equity affiliates' income | 90.0 | 72.2 | 17.8 | 25 | % |

Sales

| | % Change from Prior Year | |
|--|-----------------------------|----------|
| Underlying business | | |
| Volume | 8 | % |
| Price | 1 | % |
| Energy and natural gas cost pass-through | — | % |
| Currency | 4 | % |
| Total Consolidated Change | 13 | % |

Sales of \$4,372.3 increased 13%, or \$509.7. Underlying sales were up 9% from higher volumes of 8% and higher pricing of 1%. Volumes were higher across all regional Industrial Gases segments driven by new project onstreams in the Industrial Gases – EMEA and Industrial Gases – Asia segments and an equipment sale resulting from the termination of a contract in the Industrial Gases – Asia segment. The pricing improvement was primarily attributable to the Industrial Gases – Asia segment. Energy and natural gas cost pass-through to customers was flat versus the prior year. Favorable currency impacts, primarily from the Euro, the British Pound Sterling, and the Chinese Renminbi, increased sales by 4%.

Operating Income and Margin

Operating income of \$916.1 increased 27%, or \$192.2, due to higher volumes of \$86, lower cost reduction and asset actions of \$60, favorable currency impacts of \$41, lower business separation costs of \$33, favorable pricing, net of energy, fuel, and raw material costs, of \$28, partially offset by unfavorable net operating costs of \$56. The increase in net operating costs was primarily driven by higher incentive compensation, lower cost reimbursement, including costs for transition services, higher maintenance costs, and a legal settlement. Operating margin of 21.0% increased 230 bp, primarily due to lower cost reduction and asset actions and lower business separation costs, partially offset by higher operating costs.

On a non-GAAP basis, adjusted operating income of \$916.1 increased 12%, or \$99.4, primarily due to higher volumes, favorable currency impacts, and favorable pricing, net of energy, fuel, and raw material costs, partially offset by unfavorable net operating costs. Adjusted operating margin of 21.0% decreased 10 bp as higher costs were mostly offset by higher volumes and favorable pricing, net of power costs.

Adjusted EBITDA

Adjusted EBITDA of \$1,474.0 increased 13%, or \$167.2, primarily due to higher volumes, favorable currency, and favorable pricing, partially offset by higher costs. Adjusted EBITDA margin of 33.7% decreased 10 bp, primarily due to higher costs, mostly offset by income from regional industrial gases equity affiliates.

Equity Affiliates' Income

Equity affiliates' income of \$57.5 decreased 20%, or \$14.7, and includes \$32.5 of expense resulting from the Tax Act. Refer to Note 17, Income Taxes, to the consolidated financial statements for additional information. On a non-GAAP basis, adjusted equity affiliates' income of \$90.0 increased 25%, or \$17.8, primarily driven by Industrial Gases – Americas and Industrial Gases – EMEA affiliates.

Cost of Sales and Gross Margin

Cost of sales of \$3,078.3 increased 13%, or \$357.8, due to higher costs attributable to sales volumes of \$221, unfavorable currency impacts of \$101, and higher other costs of \$42, partially offset by lower energy and natural gas cost pass-through to customers of \$6. Gross margin of 29.6% was flat versus the prior year.

Selling and Administrative Expense

Selling and administrative expense of \$386.2 increased \$43.9, or 13.0%, primarily driven by unfavorable currency impacts and higher other costs, including incentive compensation costs. Selling and administrative expense, as a percentage of sales, decreased from 8.9% to 8.8%.

Research and Development

Research and development expense of \$29.1 decreased \$.7. Research and development expense, as a percentage of sales, decreased from .8% to .7%.

Business Separation Costs

With the disposition of the two divisions comprising the former Materials Technologies segment complete, no business separation costs were incurred during the first half of fiscal year 2018. Refer to Note 3, Discontinued Operations, and Note 4, Materials Technologies Separation, to the consolidated financial statements for additional information regarding the dispositions.

For the six months ended 31 March 2017, we incurred legal and advisory fees of \$32.5 (\$26.5 after-tax, or \$.12 per share). Our income tax provision for the six months ended 31 March 2017 includes additional tax expense of \$2.7, or \$.01 per share, related to the separation.

Cost Reduction and Asset Actions

There were no charges recorded for cost reduction and asset actions for the six months ended 31 March 2018. For the six months ended 31 March 2017, we recognized a net expense of \$60.3 (\$48.4 after-tax, or \$.23 per share), which included \$45.7 for asset actions and \$18.0 for severance and other benefits. These expenses were partially offset by the favorable settlement of the remaining \$3.4 accrued balance associated with business restructuring actions taken in 2015.

Refer to Note 5, Cost Reduction and Asset Actions, to the consolidated financial statements for additional details.

Other Income (Expense), Net

Other income (expense), net of \$37.4 decreased \$9.3, or 20.0%, primarily due to lower income from the transition services agreements with Versum and Evonik and lower sales of assets, partially offset by a favorable foreign exchange impact.

Interest Expense

| | Six Months Ended 31 March | |
|----------------------------|---------------------------------|--------|
| | 2018 | 2017 |
| Interest incurred | \$67.0 | \$72.2 |
| Less: capitalized interest | 6.8 | 12.2 |
| Interest expense | \$60.2 | \$60.0 |

Interest incurred decreased \$5.2 as the impact from a lower average debt balance of \$14 was partially offset by the impact from a higher average interest rate on the debt portfolio of \$9. The change in capitalized interest was driven by a decrease in the carrying value of projects under construction.

Other Non-Operating Income (Expense), net

Other non-operating income (expense), net of \$20.9 increased \$15.8 due to higher interest income on cash and cash items and lower pension expense. The prior year pension expense included a settlement loss of \$4.1 associated with the U.S. Supplementary Pension Plan and a settlement benefit of \$2.3 related to the disposition of EMD and PMD. The settlement benefit was previously presented in "Business separation costs" prior to the adoption of pension guidance in the first quarter of fiscal year 2018. Refer to Note 2, New Accounting Guidance, to the consolidated financial statements for additional information.

Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes. The effective tax rate was 37.2% and 23.3% for the six months ended 31 March 2018 and 2017, respectively. The current year rate was higher primarily due to the enactment of the Tax Act, which significantly changed existing U.S. tax laws, including a reduction in the federal corporate income tax rate from 35% to 21% that is effective 1 January 2018, a deemed repatriation tax on unremitted foreign earnings, as well as other changes. As a result of the Tax Act, our income tax provision for the six months ended 31 March 2018 reflects a discrete net income tax expense of \$206.5. This included a deemed repatriation tax on accumulated unremitted foreign earnings and adjustments to the future cost of repatriation from foreign investments of \$420.5, partially offset by a benefit of \$214.0 primarily from the re-measurement of our net U.S. deferred tax liabilities at the lower corporate tax rate. This expense was partially offset by a tax benefit of \$38.8 that resulted from the restructuring of foreign subsidiaries, a higher tax benefit from share-based compensation, and the mix of income in jurisdictions with a lower effective tax rate.

On a non-GAAP basis, the adjusted effective tax rate decreased from 22.4% in 2017 to 18.6% in 2018. We estimate that the lower U.S. federal statutory rate and other impacts of the Tax Act reduced our effective tax rate by approximately 2.8% for the six months ended 31 March 2018. The current year rate was also lower due to a higher tax benefit from share-based compensation and the mix of income in other jurisdictions with a lower effective tax rate. We are reporting the impacts of the Tax Act provisionally based upon reasonable estimates. The impacts are not yet finalized as they are dependent on factors and analysis not yet known or fully completed, including but not limited to, the final cash balances for fiscal year 2018, further book to U.S. tax adjustments for the earnings of foreign entities, the issuance of additional guidance, as well as our ongoing analysis of the Tax Act.

At this time, we do not anticipate a significant change in our full-year rate in fiscal year 2019 versus our estimated fiscal year 2018 full-year rate on a non-GAAP basis related to provisions of the Tax Act.

Refer to Note 17, Income Taxes, to the consolidated financial statements for additional information.

Discontinued Operations

The results of PMD and EfW are reflected in our consolidated financial statements as discontinued operations. Refer to Note 3, Discontinued Operations, to the consolidated financial statements for additional information.

Segment Analysis**Industrial Gases – Americas**

| | Six Months Ended | | | |
|---------------------------|------------------|-----------|-----------|----------|
| | 31 March | | \$ Change | % Change |
| | 2018 | 2017 | | |
| Sales | \$1,823.0 | \$1,754.0 | \$69.0 | 4 % |
| Operating income | 439.5 | 446.5 | (7.0) | (2)% |
| Operating margin | 24.1 % | 25.5 % | | (140 bp) |
| Equity affiliates' income | 35.5 | 27.7 | 7.8 | 28 % |
| Adjusted EBITDA | 715.1 | 702.0 | 13.1 | 2 % |
| Adjusted EBITDA margin | 39.2 % | 40.0 % | | (80 bp) |

Industrial Gases – Americas Sales

| | % Change from Prior Year | |
|--|-----------------------------|----------|
| Underlying business | | |
| Volume | 4 | % |
| Price | — | % |
| Currency | 1 | % |
| Energy and natural gas cost pass-through | (1 |)% |
| Total Industrial Gases – Americas | 4 | % |

Sales Change

Sales of \$1,823.0 increased 4%, or \$69.0. Underlying sales were up 4% from higher volumes as pricing was flat. The volume increase was primarily driven by higher hydrogen volumes. Lower energy and natural gas cost pass-through to customers decreased sales by 1%, and favorable currency impacts increased sales by 1%.

Industrial Gases – Americas Operating Income and Margin

Operating income of \$439.5 decreased 2%, or \$7.0, primarily due to higher costs of \$22 and lower pricing, net of power and fuel costs, of \$7, mostly offset by higher volumes of \$19 and favorable currency impacts of \$3. The higher costs included higher planned maintenance costs. Operating margin of 24.1% decreased 140 bp from the prior year, primarily due to higher costs.

Industrial Gases – Americas Equity Affiliates' Income

Equity affiliates' income of \$35.5 increased \$7.8 due to volume growth and favorable currency.

Industrial Gases – EMEA

| | Six Months Ended 31 March | | | | |
|---------------------------|------------------------------|---------|-----------|----------|---|
| | 2018 | 2017 | \$ Change | % Change | |
| Sales | \$1,077.5 | \$813.9 | \$263.6 | 32 | % |
| Operating income | 221.2 | 178.6 | 42.6 | 24 | % |
| Operating margin | 20.5 | % 21.9 | % | (140 bp) | |
| Equity affiliates' income | 24.2 | 17.8 | 6.4 | 36 | % |
| Adjusted EBITDA | 345.2 | 280.2 | 65.0 | 23 | % |
| Adjusted EBITDA margin | 32.0 | % 34.4 | % | (240 bp) | |

Industrial Gases – EMEA Sales

| | % Change from Prior Year | |
|---|-----------------------------|----------|
| Underlying business | | |
| Volume | 18 | % |
| Price | 1 | % |
| Energy and natural gas cost pass-through | 1 | % |
| Currency | 12 | % |
| Total Industrial Gases – EMEA Sales Change | 32 | % |

Sales of \$1,077.5 increased 32%, or \$263.6. Underlying sales were up 19% from higher volumes of 18% and higher pricing of 1%. The volume increase was primarily driven by a new hydrogen plant in India and higher merchant and onsite volumes. Higher energy and natural gas cost pass-through to customers increased sales by 1%. Favorable currency impacts, primarily from the Euro and British Pound Sterling, increased sales by 12%.

Industrial Gases – EMEA Operating Income and Margin

Operating income of \$221.2 increased 24%, or \$42.6, due to higher volumes of \$22 and favorable currency impacts of \$20. Operating margin of 20.5% decreased 140 bp from the prior year, primarily due to lower margins on the new hydrogen volumes in India.

Industrial Gases – EMEA Equity Affiliates’ Income

Equity affiliates’ income of \$24.2 increased \$6.4, primarily due to volume growth, lower costs, and favorable currency.

Industrial Gases – Asia

| | Six Months Ended | | | |
|---------------------------|------------------|----------|-----------|----------|
| | 31 March | | | |
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$1,201.2 | \$874.2 | \$327.0 | 37 % |
| Operating income | 324.2 | 230.7 | 93.5 | 41 % |
| Operating margin | 27.0 | % 26.4 % | | 60 bp |
| Equity affiliates’ income | 29.6 | 26.4 | 3.2 | 12 % |
| Adjusted EBITDA | 473.2 | 353.1 | 120.1 | 34 % |
| Adjusted EBITDA margin | 39.4 | % 40.4 % | | (100 bp) |

Industrial Gases – Asia Sales

| | % Change from Prior Year | |
|---|-----------------------------|----------|
| Underlying business | | |
| Volume | 26 | % |
| Price | 5 | % |
| Energy and natural gas cost pass-through | — | |
| Currency | 6 | % |
| Total Industrial Gases – Asia Sales Change | 37 | % |

Sales of \$1,201.2 increased 37%, or \$327.0. Underlying sales were up 31% from higher volumes of 26% and higher pricing of 5%. The volume increase was primarily driven by an equipment sale resulting from the termination of a contract in the first quarter of fiscal year 2018, new plant onstreams, and higher merchant volumes. Merchant pricing improved across Asia driven primarily by China. Energy and natural gas cost pass-through to customers was flat versus the prior year. Favorable currency impacts, primarily from the Chinese Renminbi, South Korean Won, and Taiwan Dollar, increased sales by 6%.

Industrial Gases – Asia Operating Income and Margin

Operating income of \$324.2 increased 41%, or \$93.5, due to higher volumes of \$66, favorable price, net of power costs, of \$32, and favorable currency impacts of \$14, partially offset by higher operating costs of \$18. Operating margin of 27.0% increased 60 bp as higher volumes and favorable price, net of power costs, were partially offset by the dilutive impact of the equipment sale noted above and unfavorable cost performance.

Industrial Gases – Asia Equity Affiliates’ Income

Equity affiliates’ income of \$29.6 increased \$3.2 due to higher volumes.

Industrial Gases – Global

| | Six Months Ended | | | |
|------------------|------------------|---------|------------|----------|
| | 31 March | | | |
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$234.7 | \$364.4 | (\$129.7) | (36)% |
| Operating income | 21.6 | 30.9 | (9.3) | (30)% |
| Adjusted EBITDA | 25.8 | 34.9 | (9.1) | (26)% |

Industrial Gases – Global Sales and Operating Income

Sales of \$234.7 decreased 36%, or \$129.7. The decrease in sales was primarily driven by lower sale of equipment activity on the multiple air separation units that will serve Saudi Aramco’s Jazan oil refinery and power plant in Saudi Arabia.

Operating income of \$21.6 decreased 30%, or \$9.3, primarily due to the lower sale of equipment activity.

Corporate and other

| | Six Months Ended 31 March | | | |
|-----------------|---------------------------------|---------|-----------|----------|
| | 2018 | 2017 | \$ Change | % Change |
| Sales | \$35.9 | \$56.1 | (\$20.2) | (36)% |
| Operating loss | (90.4) | (70.0) | (20.4) | (29)% |
| Adjusted EBITDA | (85.3) | (63.4) | (21.9) | (35)% |

Corporate and other Sales and Operating Loss

Sales of \$35.9 decreased 36%, or \$20.2, primarily due to lower activity in our LNG projects and our helium container business. Operating loss of \$90.4 increased 29%, or \$20.4, primarily due to lower LNG activity.

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 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 restructured the Company to focus on its core Industrial Gases business. This had resulted in significant cost reduction and asset actions that we believe were 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 on our pre-tax 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.

During the first quarter of fiscal year 2018, we adopted accounting guidance on the presentation of net periodic pension and postretirement benefit cost. Certain prior year information has been reclassified to conform to the fiscal year 2018 presentation. Refer to Note 2, New Accounting Guidance, to the consolidated financial statements for additional information.

Presented below are reconciliations of the reported GAAP results to the non-GAAP measures for the second quarter and first six months of fiscal year 2018 and 2017:

CONSOLIDATED RESULTS

| Q2 2018 vs. Q2 2017 | Continuing Operations Three Months Ended 31 March | | | | | | |
|----------------------------------|--|------------------------------------|---------------------------------|-------------------------|---------------|----------------|--|
| | Operating Income | Operating Margin ^(A) | Equity Affiliates' Income | Income Tax Provision | Net Income | Diluted EPS | |
| 2018 GAAP | \$455.4 | 21.1 % | \$43.7 | \$56.2 | \$416.4 | \$1.89 | |
| 2017 GAAP | 395.6 | 20.0 % | 34.2 | 94.5 | 304.4 | 1.39 | |
| Change GAAP | \$59.8 | 110 bp | \$9.5 | (\$38.3) | \$112.0 | \$.50 | |
| % Change GAAP | 15 % | | 28 % | (41)% | 37 % | 36 % | |
| 2018 GAAP | \$455.4 | 21.1 % | \$43.7 | \$56.2 | \$416.4 | \$1.89 | |
| Tax restructuring benefit | — | — % | — | 38.8 | (38.8) | (.18) | |
| 2018 Non-GAAP Measure | \$455.4 | 21.1 % | \$43.7 | \$95.0 | \$377.6 | \$1.71 | |
| 2017 GAAP | \$395.6 | 20.0 % | \$34.2 | \$94.5 | \$304.4 | \$1.39 | |
| Cost reduction and asset actions | 10.3 | .5 % | — | 3.1 | 7.2 | .03 | |
| Pension settlement loss | — | — % | — | 1.5 | 2.6 | .01 | |
| 2017 Non-GAAP Measure | \$405.9 | 20.5 % | \$34.2 | \$99.1 | \$314.2 | \$1.43 | |
| Change Non-GAAP Measure | \$49.5 | 60 bp | \$9.5 | (\$4.1) | \$63.4 | \$.28 | |
| % Change Non-GAAP Measure | 12 % | | 28 % | (4)% | 20 % | 20 % | |

| 2018 vs. 2017 | Continuing Operations Six Months Ended 31 March | | | | | | |
|---|--|------------------------------------|---------------------------------|-------------------------|---------------|----------------|--|
| | Operating Income | Operating Margin ^(A) | Equity Affiliates' Income | Income Tax Provision | Net Income | Diluted EPS | |
| 2018 GAAP | \$916.1 | 21.0 % | \$57.5 | \$348.0 | \$572.0 | \$2.59 | |
| 2017 GAAP | 723.9 | 18.7 % | 72.2 | 172.9 | 556.0 | 2.53 | |
| Change GAAP | \$192.2 | 230 bp | (\$14.7) | \$175.1 | \$16.0 | \$.06 | |
| % Change GAAP | 27 % | | (20)% | 101 % | 3 % | 2 % | |
| 2018 GAAP | \$916.1 | 21.0 % | \$57.5 | \$348.0 | \$572.0 | \$2.59 | |
| Tax reform repatriation | — | — % | 32.5 | (420.5) | 453.0 | 2.06 | |
| Tax reform rate change and other | — | — % | — | 214.0 | (214.0) | (.97) | |
| Tax restructuring benefit | — | — % | — | 38.8 | (38.8) | (.18) | |
| 2018 Non-GAAP Measure | \$916.1 | 21.0 % | \$90.0 | \$180.3 | \$772.2 | \$3.50 | |
| 2017 GAAP | \$723.9 | 18.7 % | \$72.2 | \$172.9 | \$556.0 | \$2.53 | |
| Business separation costs | 32.5 | .8 % | — | 3.7 | 26.5 | .12 | |
| Tax costs associated with business separation | — | — % | — | (2.7) | 2.7 | .01 | |
| Cost reduction and asset actions | 60.3 | 1.6 % | — | 11.9 | 48.4 | .23 | |
| Pension settlement loss | — | — % | — | 1.5 | 2.6 | .01 | |
| 2017 Non-GAAP Measure | \$816.7 | 21.1 % | \$72.2 | \$187.3 | \$636.2 | \$2.90 | |
| Change Non-GAAP Measure | \$99.4 | (10)bp | \$17.8 | (\$7.0) | \$136.0 | \$.60 | |
| % Change Non-GAAP Measure | 12 % | | 25 % | (4)% | 21 % | 21 % | |

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

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:

| | Three Months Ended | | Six Months Ended | |
|---|--------------------|----------------|------------------|------------------|
| | 31 March | | 31 March | |
| | 2018 | 2017 | 2018 | 2017 |
| Income from Continuing Operations^(A) | \$423.6 | \$310.1 | \$586.3 | \$568.3 |
| Add: Interest expense | 30.4 | 30.5 | 60.2 | 60.0 |
| Less: Other non-operating income (expense), net | 11.1 | 5.3 | 20.9 | 5.1 |
| Add: Income tax provision | 56.2 | 94.5 | 348.0 | 172.9 |
| Add: Depreciation and amortization | 240.0 | 211.8 | 467.9 | 417.9 |
| Add: Business separation costs | — | — | — | 32.5 |
| Add: Cost reduction and asset actions | — | 10.3 | — | 60.3 |
| Add: Tax reform repatriation - equity method investment | — | — | 32.5 | — |
| Adjusted EBITDA | \$739.1 | \$651.9 | \$1,474.0 | \$1,306.8 |
| Change GAAP | | | | |
| Income from continuing operations change | \$113.5 | | \$18.0 | |
| Income from continuing operations % change | 37 | % | 3 | % |
| Change Non-GAAP | | | | |
| Adjusted EBITDA change | \$87.2 | | \$167.2 | |
| Adjusted EBITDA % change | 13 | % | 13 | % |

^(A) Includes net income attributable to noncontrolling interests.

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 |
|---|----------------------------------|------------------------------|------------------------------|--------------------------------|------------------------|------------------|
| <u>GAAP MEASURE</u> | | | | | | |
| Three Months Ended 31 March 2018 | | | | | | |
| Operating income (loss) | \$222.3 | \$116.7 | \$148.7 | \$12.1 | (\$44.4) | \$455.4 |
| Operating margin | 24.3 % | 20.8 % | 26.7 % | | | 21.1 % |
| Three Months Ended 31 March 2017 | | | | | | |
| Operating income (loss) | \$223.2 | \$88.6 | \$112.3 | \$22.7 | (\$40.9) | \$405.9 |
| Operating margin | 25.1 % | 21.4 % | 25.8 % | | | 20.5 % |
| Operating income (loss) change | (\$.9) | \$28.1 | \$36.4 | (\$10.6) | (\$3.5) | \$49.5 |
| Operating income (loss) % change | — % | 32 % | 32 % | (47)% | (9)% | 12 % |
| Operating margin change | (80) bp | (60) bp | 90 bp | | | 60 bp |
| <u>NON-GAAP MEASURE</u> | | | | | | |
| Three Months Ended 31 March 2018 | | | | | | |
| Operating income (loss) | \$222.3 | \$116.7 | \$148.7 | \$12.1 | (\$44.4) | \$455.4 |
| Add: Depreciation and amortization | 122.3 | 50.7 | 62.6 | 1.9 | 2.5 | 240.0 |
| Add: Equity affiliates' income | 16.9 | 11.1 | 15.4 | .3 | — | 43.7 |
| Adjusted EBITDA | \$361.5 | \$178.5 | \$226.7 | \$14.3 | (\$41.9) | \$739.1 |
| Adjusted EBITDA margin | 39.6 % | 31.8 % | 40.7 % | | | 34.3 % |
| Three Months Ended 31 March 2017 | | | | | | |
| Operating income (loss) | \$223.2 | \$88.6 | \$112.3 | \$22.7 | (\$40.9) | \$405.9 |
| Add: Depreciation and amortization | 116.0 | 41.6 | 49.3 | 1.7 | 3.2 | 211.8 |
| Add: Equity affiliates' income | 13.0 | 8.3 | 12.9 | — | — | 34.2 |
| Adjusted EBITDA | \$352.2 | \$138.5 | \$174.5 | \$24.4 | (\$37.7) | \$651.9 |
| Adjusted EBITDA margin | 39.6 % | 33.4 % | 40.0 % | | | 32.9 % |
| Adjusted EBITDA change | \$9.3 | \$40.0 | \$52.2 | (\$10.1) | (\$4.2) | \$87.2 |
| Adjusted EBITDA % change | 3 % | 29 % | 30 % | (41)% | (11)% | 13 % |
| Adjusted EBITDA margin change | — | (160) bp | 70 bp | | | 140 bp |

| | Industrial Gases— Americas | Industrial Gases— EMEA | Industrial Gases— Asia | Industrial Gases— Global | Corporate Segment and other | Segment Total |
|---------------------------------------|----------------------------------|------------------------------|------------------------------|--------------------------------|--------------------------------|------------------|
| <u>GAAP MEASURE</u> | | | | | | |
| Six Months Ended 31 March 2018 | | | | | | |
| Operating income (loss) | \$439.5 | \$221.2 | \$324.2 | \$21.6 | (\$90.4) | \$916.1 |
| Operating margin | 24.1 % | 20.5 % | 27.0 % | | | 21.0 % |
| Six Months Ended 31 March 2017 | | | | | | |
| Operating income (loss) | \$446.5 | \$178.6 | \$230.7 | \$30.9 | (\$70.0) | \$816.7 |
| Operating margin | 25.5 % | 21.9 % | 26.4 % | | | 21.1 % |
| Operating income (loss) change | (\$7.0) | \$42.6 | \$93.5 | (\$9.3) | (\$20.4) | \$99.4 |
| Operating income (loss) % change | (2)% | 24 % | 41 % | (30)% | (29)% | 12 % |
| Operating margin change | (140) bp | (140) bp | 60 bp | | | (10) bp |
| <u>NON-GAAP MEASURE</u> | | | | | | |
| Six Months Ended 31 March 2018 | | | | | | |
| Operating income (loss) | \$439.5 | \$221.2 | \$324.2 | \$21.6 | (\$90.4) | \$916.1 |
| Add: Depreciation and amortization | 240.1 | 99.8 | 119.4 | 3.5 | 5.1 | 467.9 |
| Add: Equity affiliates' income | 35.5 | 24.2 | 29.6 | .7 | — | 90.0 |
| Adjusted EBITDA | \$715.1 | \$345.2 | \$473.2 | \$25.8 | (\$85.3) | \$1,474.0 |
| Adjusted EBITDA margin | 39.2 % | 32.0 % | 39.4 % | | | 33.7 % |
| Six Months Ended 31 March 2017 | | | | | | |
| Operating income (loss) | \$446.5 | \$178.6 | \$230.7 | \$30.9 | (\$70.0) | \$816.7 |
| Add: Depreciation and amortization | 227.8 | 83.8 | 96.0 | 3.7 | 6.6 | 417.9 |
| Add: Equity affiliates' income | 27.7 | 17.8 | 26.4 | .3 | — | 72.2 |
| Adjusted EBITDA | \$702.0 | \$280.2 | \$353.1 | \$34.9 | (\$63.4) | \$1,306.8 |
| Adjusted EBITDA margin | 40.0 % | 34.4 % | 40.4 % | | | 33.8 % |
| Adjusted EBITDA change | \$13.1 | \$65.0 | \$120.1 | (\$9.1) | (\$21.9) | \$167.2 |
| Adjusted EBITDA % change | 2 % | 23 % | 34 % | (26)% | (35)% | 13 % |
| Adjusted EBITDA margin change | (80) bp | (240) bp | (100) bp | | | (10) bp |

Below is a reconciliation of segment total operating income to consolidated operating income:

| | Three Months Ended 31 March | | Six Months Ended 31 March | |
|----------------------------------|-----------------------------------|----------------|---------------------------------|----------------|
| | 2018 | 2017 | 2018 | 2017 |
| Operating Income | | | | |
| Segment total | \$455.4 | \$405.9 | \$916.1 | \$816.7 |
| Business separation costs | — | — | — | (32.5) |
| Cost reduction and asset actions | — | (10.3) | — | (60.3) |
| Consolidated Total | \$455.4 | \$395.6 | \$916.1 | \$723.9 |

Below is a reconciliation of segment total equity affiliates' income to consolidated equity affiliates' income:

| | Three Months Ended 31 March 2018 | Six Months Ended 31 March 2017 | 2018 | 2017 |
|--|--|---|---------------|---------------|
| Equity Affiliates' Income | | | | |
| Segment total | \$43.7 | \$34.2 | \$90.0 | \$72.2 |
| Tax reform repatriation - equity method investment | — | — | (32.5) | — |
| Consolidated Total | \$43.7 | \$34.2 | \$57.5 | \$72.2 |

INCOME TAXES

The tax impact on our pre-tax 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. For additional discussion on the fiscal year 2018 non-GAAP tax adjustments, including the impact of the Tax Act, refer to Note 17, Income Taxes, to the consolidated financial statements.

| | Effective Tax Rate | | | |
|--|-----------------------------------|----------------|------------------------------|----------------|
| | Three Months Ended 31 March | | Six Months Ended 31 March | |
| | 2018 | 2017 | 2018 | 2017 |
| Income Tax Provision—GAAP | \$56.2 | \$94.5 | \$348.0 | \$172.9 |
| Income From Continuing Operations Before Taxes—GAAP | \$479.8 | \$404.6 | \$934.3 | \$741.2 |
| Effective Tax Rate—GAAP | 11.7 | % 23.4 | % 37.2 | % 23.3 |
| Income Tax Provision—GAAP | \$56.2 | \$94.5 | \$348.0 | \$172.9 |
| Business separation costs | — | — | — | 3.7 |
| Tax costs associated with business separation | — | — | — | (2.7) |
| Cost reduction and asset actions | — | 3.1 | — | 11.9 |
| Pension settlement loss | — | 1.5 | — | 1.5 |
| Tax reform repatriation | — | — | (420.5) | — |
| Tax reform rate change and other | — | — | 214.0 | — |
| Tax restructuring benefit | 38.8 | — | 38.8 | — |
| Income Tax Provision—Non-GAAP Measure | \$95.0 | \$99.1 | \$180.3 | \$187.3 |
| Income From Continuing Operations Before Taxes—GAAP | \$479.8 | \$404.6 | \$934.3 | \$741.2 |
| Business separation costs | — | — | — | 30.2 |
| Cost reduction and asset actions | — | 10.3 | — | 60.3 |
| Pension settlement loss | — | 4.1 | — | 4.1 |
| Tax reform repatriation - equity method investment | — | — | 32.5 | — |
| Income From Continuing Operations Before Taxes—Non-GAAP Measure | \$479.8 | \$419.0 | \$966.8 | \$835.8 |
| Effective Tax Rate—Non-GAAP Measure | 19.8 | % 23.7 | % 18.6 | % 22.4 |

PENSION BENEFITS

As noted in Note 2, New Accounting Guidance, to the consolidated financial statements, we early adopted guidance on the presentation of net periodic pension and postretirement benefit cost during the first quarter of fiscal year 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 non-service related costs are presented outside of operating income in "Other non-operating income (expense), net."

For the six months ended 31 March 2018 and 2017, total company net periodic pension cost was \$25.2 and \$36.2, respectively. We recognized service-related costs of \$26.3 and \$27.4, respectively, on our consolidated income statements within operating income. The non-service benefit of \$1.1 and cost of \$8.8 were included in "Other non-operating income (expense), net" for the six months ended 31 March 2018 and 2017, respectively. The decrease in pension expense in fiscal year 2018 results from lower loss amortization primarily due to favorable asset experience and the effects of the disposition of the former Materials Technologies segment. The costs capitalized in fiscal year 2018 and 2017 were not material.

For the six months ended 31 March 2018 and 2017, we recognized a pension settlement loss of \$3.3 and \$5.8, respectively, in "Other non-operating income (expense), net" on our consolidated income statements to accelerate recognition of a portion of actuarial gains and losses deferred in accumulated other comprehensive loss. The pension settlement loss in fiscal year 2018 was associated with the U.S. Supplementary Pension Plan. The pension settlement loss in fiscal year 2017 resulted from the disposition of the former Materials Technologies segment. We expect total pension settlement losses of approximately \$6 in fiscal year 2018.

Management considers various factors when making pension funding decisions, including tax, cash flow, and regulatory implications. For the six months ended 31 March 2018 and 2017, our cash contributions to funded pension plans and benefit payments under unfunded pension plans were \$35.9 and \$40.8, respectively. Total contributions for fiscal 2018 are expected to be approximately \$50 to \$70. During fiscal 2017, total contributions were \$64.1.

Refer to Note 11, Retirement Benefits, to the consolidated financial statements for details on pension cost and cash contributions.

LIQUIDITY AND CAPITAL RESOURCES

We have consistent access to commercial paper markets, and our cash balance and cash flows from operations and financing activities are expected to meet liquidity needs for the foreseeable future.

As of 31 March 2018, we had \$1,408.4 of foreign cash and cash items compared to total cash and cash items of \$3,066.9. As a result of the Tax Act, we currently do not expect that a significant portion of the earnings of our foreign subsidiaries and affiliates will be subject to U.S. income tax upon subsequent repatriation to the United States. Depending on the country in which the subsidiaries and affiliates reside, the repatriation of these earnings may be subject to foreign withholding and other taxes.

Operating Activities

For the first six months of 2018, cash provided by operating activities was \$1,110.1. Income from continuing operations of \$572.0 was adjusted for items including depreciation and amortization, deferred income taxes, impacts from the Tax Act, undistributed earnings of unconsolidated affiliates, share-based compensation, and noncurrent capital lease receivables. The tax reform repatriation adjustment of \$310.3 represents our obligation for the deemed repatriation tax resulting from the Tax Act and is payable over a period of eight years. Undistributed earnings of unconsolidated affiliates includes \$32.5 of expense resulting from the Tax Act. See Note 17, Income Taxes, to the consolidated financial statements for additional information. The working capital accounts were a use of cash of \$260.8, primarily driven by \$260.4 from payables and accrued liabilities. The use of cash within payables and accrued liabilities is primarily driven by a decrease in customer advances of \$68.1, primarily related to sale of equipment activity, a \$47.6 decrease in accrued incentive compensation due to payments on the 2017 plan, and \$23.8 of severance payments.

For the first six months of 2017, cash provided by operating activities was \$861.2, which includes income from continuing operations of \$556.0. The working capital accounts were a use of cash of \$149.7, primarily driven by payables and accrued liabilities, trade receivables, and other working capital, partially offset by other receivables. The decrease in payables and accrued liabilities of \$178.6 was primarily driven by a decrease in customer advances of

\$85.1 related to our joint venture in Jazan, Saudi Arabia, and a \$75.8 decrease in accrued incentive compensation due to payments on the 2016 plan. The decrease in trade receivables of \$53.8 includes amounts billed to our joint venture in Jazan, Saudi Arabia. Other working capital was a use of \$51.4, primarily driven by payments for accrued income taxes. The decrease in other receivables, which resulted in a source of \$118.4, was primarily due to the maturity of forward foreign exchange contracts that hedged intercompany loans.

We estimate that cash paid for taxes, net of refunds, on a continuing operations basis was \$153.7 and \$275.0 for the six months ended 31 March 2018 and 2017, respectively.

Investing Activities

For the first six months of 2018, cash used for investing activities was \$544.9. Capital expenditures for plant and equipment were \$572.5. Cash paid for acquisitions, net of cash acquired, was \$271.4. See Note 6, Business Combinations, to the consolidated financial statements for further details. Net proceeds from the maturities of short-term investments was a source of cash of \$267.2.

For the first six months of 2017, cash used for investing activities was \$1,952.4. Purchases of investments of \$1,823.2 include time deposits, certificates of deposit, and repurchase agreement funds with original maturities greater than 90 days and less than one year. Proceeds from investments of \$400.0 resulted from an early call on an instrument which had an original term greater than 90 days but less than one year. These proceeds were reinvested in a new short-term investment, which is included in the purchase of investments. Capital expenditures for plant and equipment were \$532.2.

Capital expenditures are detailed in the table below:

| | Six Months Ended 31 March | |
|---|---------------------------------|---------|
| | 2018 | 2017 |
| Additions to plant and equipment | \$572.5 | \$532.2 |
| Acquisitions, less cash acquired | 271.4 | — |
| Investment in and advances to unconsolidated affiliates | — | 8.9 |
| Capital expenditures on a GAAP basis | \$843.9 | \$541.1 |
| Capital lease expenditures ^(A) | 12.3 | 5.8 |
| Capital expenditures on a Non-GAAP basis | \$856.2 | \$546.9 |

We utilize a non-GAAP measure in the computation of capital expenditures and include spending associated with facilities accounted for as capital leases. 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 within cash provided by operating activities if the arrangement qualifies as a capital lease. 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.

We expect capital expenditures of approximately \$1,800 to \$2,000 on a GAAP and non-GAAP basis in fiscal year 2018. This range includes our investment in our joint venture, Air Products Lu'an (Changzhi) Co., Ltd., with Lu'An Clean Energy Company, which closed on 26 April 2018. See Note 6, Business Combinations, to the consolidated financial statements for additional information.

Sales backlog represents our estimate of revenue to be recognized in the future on sale of equipment orders and related process technologies that are under firm contracts. The sales backlog for the Company at 31 March 2018 was \$317, compared to \$481 at 30 September 2017.

Financing Activities

For the first six months of 2018, cash used for financing activities was \$815.6. This consisted primarily of repayment on long-term debt of \$409.2 and dividend payments to shareholders of \$415.5. Payments on long-term debt primarily related to the repayment of a 1.2% U.S. Senior Note of \$400.0 that matured on 16 October 2017.

For the first six months of 2017, cash used for financing activities was \$1,661.8. This consisted primarily of repayments of commercial paper and short-term borrowings of \$816.6, payments on long-term debt of \$469.7, and dividend payments to shareholders of \$374.0. 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.

Discontinued Operations

For the first six months of 2017, cash flows of discontinued operations primarily include impacts associated with the spin-off of EMD as Versum on 1 October 2016 and the sale of PMD on 3 January 2017. Cash used for operating

activities of \$520.8 was primarily driven by taxes paid on the gain on 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, and Note 4, Materials Technologies Separation, to the consolidated financial statements for additional information.

Financing and Capital Structure

Capital needs were satisfied primarily with cash from operations. Total debt at 31 March 2018 and 30 September 2017, expressed as a percentage of total capitalization (total debt plus total equity), was 25.0% and 28.0%, respectively. Total debt decreased from \$3,962.8 at 30 September 2017 to \$3,566.5 at 31 March 2018, primarily due to the repayment of the 1.2% U.S. Senior Note.

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 31 March 2018.

Commitments totaling \$16.6 are maintained by our foreign subsidiaries, all of which was borrowed and outstanding at 31 March 2018.

As of 31 March 2018, we were 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. During the first six months of fiscal year 2018, we did not purchase any of our outstanding shares. At 31 March 2018, \$485.3 in share repurchase authorization remained.

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. As discussed in Note 17, Income Taxes, to the consolidated financial statements, our income tax provision includes an expense for a deemed repatriation tax on unremitted foreign earnings resulting from the Tax Act that was enacted during the first quarter of fiscal year 2018. Of the expense, \$263 is recorded in noncurrent liabilities and will be paid over eight years beginning in fiscal year 2019. Our unconditional purchase obligations for helium purchases were approximately \$6,500 as of 31 March 2018. The majority of these obligations occur after fiscal year 2022. Helium purchases 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-if-tendered 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.

On 10 September 2017, Air Products signed an agreement to form a joint venture, Air Products Lu'an (Changzhi) Co., Ltd. ("the JV"), with Lu'An Clean Energy Company ("Lu'An"). Air Products has already invested \$300 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 to acquire gasification and syngas clean-up assets from Lu'An. Air Products will own 60% of the JV and will consolidate its financial results. On 26 April 2018, we completed the formation of the JV and paid cash of approximately 1.7 billion RMB (approximately \$270). We expect to make a final payment of approximately 1.5 billion RMB (approximately \$230 as of 26 April 2018) in the fourth quarter of 2018. See Note 6, Business Combinations, to the consolidated financial statements for additional information.

Other than the above, there have been no material changes to our contractual obligations since 30 September 2017.

COMMITMENTS AND CONTINGENCIES

Refer to Note 12, Commitments and Contingencies, to the consolidated financial statements for information concerning our commitments and contingencies, including litigation and environmental matters.

OFF-BALANCE SHEET ARRANGEMENTS

There have been no material changes to off-balance sheet arrangements since 30 September 2017. 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. During the three and six months ended 31 March 2018, sales were approximately \$60 and \$150, respectively, related to this contract. During the three and six months ended 31 March 2017, sales were approximately \$170 and \$280, respectively.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Management's Discussion and Analysis of our financial condition and results of operations is based on the consolidated financial statements and accompanying notes that have been prepared in accordance with GAAP. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Other than those detailed below and in Note 2, New Accounting Guidance, to the consolidated financial statements, there have been no changes in accounting policy or accounting estimate in the current period that had a significant impact on our financial condition, change in financial condition, liquidity, or results of operations.

Revenue Recognition

Revenue from equipment sale contracts is recorded primarily using the percentage-of-completion method. Changes in estimates on projects accounted for under the percentage-of-completion method favorably impacted operating income by approximately \$10 and \$12 for the three months ended 31 March 2018 and 2017, respectively.

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 in the future.

Income Taxes

On 22 December 2017, the United States enacted the Tax Act, which had a significant impact on our consolidated financial statements for the six months ended 31 March 2018. The impacts reflect provisional amounts for which accounting was incomplete but a reasonable estimate could be determined. Updates to the estimates are permissible for a period of no greater than one year. Refer to Note 17, Income Taxes, to the consolidated financial statements for additional information.

NEW ACCOUNTING GUIDANCE

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 quarterly report 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; 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 the Company's Form 10-K for its fiscal year ended 30 September 2017. 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.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

Information on our utilization of financial instruments and an analysis of the sensitivity of these instruments to selected changes in market rates and prices is included in our 2017 Form 10-K.

The net financial instrument position decreased from a liability of \$3,832.3 at 30 September 2017 to a liability of \$3,453.5 at 31 March 2018. The decrease was due primarily to the repayment of long-term debt.

Interest Rate Risk

There were no material changes to the sensitivity analysis related to the fixed portion of our debt portfolio since 30 September 2017.

There were no material changes to the sensitivity analysis related to the variable portion of our debt portfolio since 30 September 2017.

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 period end, 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 \$330 and \$312 in the net liability position of financial instruments at 31 March 2018 and 30 September 2017, respectively.

Item 4. 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 31 March 2018. Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that, as of 31 March 2018, the disclosure controls and procedures were effective.

Internal Control Over Financial Reporting

There was no change in the Company's internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended 31 March 2018 that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

PART II. OTHER INFORMATION

Item 5. Other Information

Not applicable.

Item 6. Exhibits.

(a) Exhibits required by Item 601 of Regulation S-K

| Exhibit No. | Description |
|----------------|--|
| 12. | <u>Computation of Ratios of Earnings to Fixed Charges.</u> |
| 31.1 | <u>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.</u> |
| 31.2 | <u>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.</u> |
| 32.1 | <u>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.</u> † |
| 101.INS | XBRL Instance Document. The XBRL Instance Document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL 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 |

The certification attached as Exhibit 32 that accompanies this Quarterly Report on Form 10-Q, 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-Q, irrespective of any general incorporation language contained in such filing.

SIGNATURE

Pursuant to the requirements 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)

Date: 26 April 2018 By: /s/ M. Scott Crocco

M. Scott Crocco

Executive Vice President and Chief Financial Officer