

**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 **September 30, 2017**
OR
- TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from _____ to _____
Commission File Number: **001-38221**

PQ Group Holdings Inc.

Delaware (State or other jurisdiction of incorporation or organization)	81-3406833 (I.R.S. Employer Identification No.)
300 Lindenwood Drive Valleybrooke Corporate Center Malvern, Pennsylvania (Address of principal executive offices)	19355 (Zip Code)
(610) 651-4400 (Registrant's telephone number, including area code)	

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 website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/> (Do not check if a smaller reporting company)	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

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

The number of shares of common stock outstanding as of November 10, 2017 was 135,240,826.

PQ GROUP HOLDINGS INC.

INDEX - FORM 10-Q

	<u>Page</u>
<u>PART I FINANCIAL INFORMATION</u>	
<u>Item 1. Financial Statements (Unaudited)</u>	
<u>Condensed Consolidated Balance Sheets</u>	<u>3</u>
<u>Condensed Consolidated Statements of Operations</u>	<u>4</u>
<u>Condensed Consolidated Statements of Comprehensive Income (Loss)</u>	<u>5</u>
<u>Condensed Consolidated Statements of Stockholders' Equity</u>	<u>6</u>
<u>Condensed Consolidated Statements of Cash Flows</u>	<u>7</u>
<u>Notes to Condensed Consolidated Financial Statements</u>	<u>8</u>
<u>Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations</u>	<u>30</u>
<u>Item 3. Quantitative and Qualitative Disclosures About Market Risk</u>	<u>52</u>
<u>Item 4. Controls and Procedures</u>	<u>52</u>
<u>PART II OTHER INFORMATION</u>	
<u>Item 1. Legal Proceedings</u>	<u>53</u>
<u>Item 1A. Risk Factors</u>	<u>53</u>
<u>Item 2. Unregistered Sales of Equity Securities and Use of Proceeds</u>	<u>53</u>
<u>Item 6. Exhibits</u>	<u>54</u>
<u>SIGNATURES</u>	<u>55</u>

PART I—FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS
(UNAUDITED).

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED BALANCE SHEETS
(in thousands, except share and per share amounts)
(unaudited)

	September 30, 2017	December 31, 2016
ASSETS		
Cash and cash equivalents	\$ 68,838	\$ 70,742
Receivables, net	212,018	160,581
Inventories	235,921	227,048
Prepaid and other current assets	29,010	34,307
Total current assets	545,787	492,678
Investments in affiliated companies	479,366	459,406
Property, plant and equipment, net	1,209,047	1,181,388
Goodwill	1,306,547	1,241,429
Other intangible assets, net	800,423	816,573
Other long-term assets	74,433	68,197
Total assets	\$ 4,415,603	\$ 4,259,671
LIABILITIES		
Notes payable and current maturities of long-term debt	\$ 54,255	\$ 14,481
Accounts payable	129,793	128,478
Accrued liabilities	112,788	99,433
Total current liabilities	296,836	242,392
Long-term debt	2,597,481	2,547,717
Deferred income taxes	319,738	318,463
Other long-term liabilities	120,578	123,155
Total liabilities	3,334,633	3,231,727
Commitments and contingencies (Note 16)		
EQUITY		
Common stock (\$0.01 par); authorized shares 450,000,000; issued shares 106,219,759 and 106,452,330 on September 30, 2017 and December 31, 2016, respectively; outstanding shares 104,109,932 and 103,947,887 on September 30, 2017 and December 31, 2016, respectively	1,062	73
Preferred stock (\$0.01 par); authorized shares 50,000,000; no shares issued or outstanding on September 30, 2017 and December 31, 2016	—	—
Additional paid-in capital	1,169,778	1,167,137
Accumulated deficit	(97,788)	(90,380)
Treasury stock, at cost; shares 21,519 on December 31, 2016	—	(239)
Accumulated other comprehensive income (loss)	2,978	(53,711)
Total PQ Group Holdings Inc. equity	1,076,030	1,022,880
Noncontrolling interest	4,940	5,064
Total equity	1,080,970	1,027,944
Total liabilities and equity	\$ 4,415,603	\$ 4,259,671

See accompanying notes to condensed consolidated financial statements.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except share and per share amounts)
(unaudited)

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Sales	\$ 391,829	\$ 369,979	\$ 1,114,027	\$ 741,446
Cost of goods sold	289,270	274,680	821,342	557,748
Gross profit	102,559	95,299	292,685	183,698
Selling, general and administrative expenses	36,169	36,003	105,907	74,017
Other operating expense, net	19,833	15,042	47,156	40,630
Operating income	46,557	44,254	139,622	69,051
Equity in net (income) loss from affiliated companies	(10,257)	4,616	(24,879)	9,309
Interest expense	49,079	48,610	144,041	94,362
Debt extinguishment costs	453	—	453	11,858
Other expense, net	5,126	4,170	21,739	7,194
Income (loss) before income taxes and noncontrolling interest	2,156	(13,142)	(1,732)	(53,672)
Provision for (benefit from) income taxes	5,172	(3,536)	5,269	36,013
Net loss	(3,016)	(9,606)	(7,001)	(89,685)
Less: Net income attributable to the noncontrolling interest	329	411	407	725
Net loss attributable to PQ Group Holdings Inc.	\$ (3,345)	\$ (10,017)	\$ (7,408)	\$ (90,410)
Net loss per common share:				
Basic loss per share	\$ (0.03)	\$ (0.10)	\$ (0.07)	\$ (1.10)
Diluted loss per share	\$ (0.03)	\$ (0.10)	\$ (0.07)	\$ (1.10)
Weighted average shares outstanding:				
Basic	104,096,837	103,783,719	104,020,180	81,986,221
Diluted	104,096,837	103,783,719	104,020,180	81,986,221

See accompanying notes to condensed consolidated financial statements.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(in thousands)
(unaudited)

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Net loss	\$ (3,016)	\$ (9,606)	\$ (7,001)	\$ (89,685)
Other comprehensive income (loss), net of tax:				
Pension and postretirement benefits	(20)	162	(223)	486
Net (loss) gain from hedging activities	(301)	201	(3,326)	1,302
Foreign currency translation	18,850	1,286	60,492	(7,919)
Total other comprehensive income (loss)	18,529	1,649	56,943	(6,131)
Comprehensive income (loss)	15,513	(7,957)	49,942	(95,816)
Less: Comprehensive income (loss) attributable to noncontrolling interests	82	(165)	661	(165)
Comprehensive income (loss) attributable to PQ Group Holdings Inc.	<u>\$ 15,431</u>	<u>\$ (7,792)</u>	<u>\$ 49,281</u>	<u>\$ (95,651)</u>

See accompanying notes to condensed consolidated financial statements.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands)
(unaudited)

	Common stock	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Non- controlling interest	Total
Balance, December 31, 2016	\$ 73	\$ 1,167,137	\$ (90,380)	\$ (239)	\$ (53,711)	\$ 5,064	\$ 1,027,944
Net income (loss)	—	—	(7,408)	—	—	407	(7,001)
Stock split and conversion	989	(1,228)	—	239	—	—	—
Other comprehensive income (loss)	—	—	—	—	56,689	254	56,943
Dividend distribution	—	—	—	—	—	(785)	(785)
Stock compensation expense	—	3,869	—	—	—	—	3,869
Balance, September 30, 2017	<u>\$ 1,062</u>	<u>\$ 1,169,778</u>	<u>\$ (97,788)</u>	<u>\$ —</u>	<u>\$ 2,978</u>	<u>\$ 4,940</u>	<u>\$ 1,080,970</u>

	Common stock	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Non- controlling interest	Total
Balance, December 31, 2015	\$ —	\$ 245,279	\$ (10,634)	\$ —	\$ 648	\$ —	\$ 235,293
Business Combination	73	912,127	—	—	—	6,569	918,769
Net income (loss)	—	—	(90,410)	—	—	725	(89,685)
Other comprehensive income (loss)	—	—	—	—	(5,518)	(613)	(6,131)
Stock repurchase	—	—	—	(2,540)	—	—	(2,540)
Equity contribution	—	6,486	—	114	—	—	6,600
Dividend distribution	—	—	—	—	—	(476)	(476)
Stock compensation expense	—	2,666	—	2,237	—	—	4,903
Balance, September 30, 2016	<u>\$ 73</u>	<u>\$ 1,166,558</u>	<u>\$ (101,044)</u>	<u>\$ (189)</u>	<u>\$ (4,870)</u>	<u>\$ 6,205</u>	<u>\$ 1,066,733</u>

See accompanying notes to condensed consolidated financial statements.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)
(unaudited)

	Nine months ended September 30,	
	2017	2016
Cash flows from operating activities:		
Net loss	\$ (7,001)	\$ (89,685)
Adjustments to reconcile net loss to net cash provided by operating activities:		
Depreciation	89,987	60,173
Amortization	39,148	25,429
Acquisition accounting valuation adjustments on inventory sold	871	23,518
Amortization of deferred financing costs and original issue discount	6,626	4,443
Debt extinguishment costs	253	7,182
Debt modification creditor fees capitalized	—	(1,932)
Foreign currency exchange loss	21,612	6,240
Pension and postretirement healthcare benefit expense	2,642	2,741
Pension and postretirement healthcare benefit funding	(7,525)	(2,258)
Deferred income tax (benefit) expense	(12,447)	18,741
Net loss on asset disposals	6,419	2,288
Supplemental pension plan mark-to-market gain	(708)	(393)
Stock compensation	3,869	4,904
Equity in net (income) loss from affiliated companies	(24,879)	9,309
Dividends received from affiliated companies	19,071	136
Working capital changes that provided (used) cash, excluding the effect of business combinations:		
Receivables	(28,900)	3,483
Inventories	4,897	13,832
Prepays and other current assets	(6,000)	(824)
Accounts payable	(9,044)	(7,332)
Accrued liabilities	13,460	10,125
Other, net	(2,535)	(812)
Net cash provided by operating activities	109,816	89,308
Cash flows from investing activities:		
Purchases of property, plant and equipment	(90,229)	(69,798)
Investment in affiliated companies	(9,000)	—
Change in restricted cash, net	12,135	(6,199)
Loan receivable under the New Markets Tax Credit Arrangement	(6,221)	(7,823)
Business combinations, net of cash acquired	(41,572)	(1,777,740)
Other, net	391	—
Net cash used in investing activities	(134,496)	(1,861,560)
Cash flows from financing activities:		
Draw down of revolver	302,725	118,000
Repayments of revolver	(270,088)	(125,000)
Issuance of long-term debt under the New Market Tax Credit arrangement	8,820	11,000
Issuance of long-term debt, net of original issue discount and financing fees	—	1,172,980
Issuance of long-term notes, net of original issue discount and financing fees	—	1,123,777
Debt issuance costs	(1,205)	(5,397)
Repayments of long-term debt	(10,289)	(475,998)
Interest hedge premium	—	(1,551)
Equity contribution	—	6,600
Stock repurchase	—	(2,540)
Distributions to noncontrolling interests	(785)	(476)
Net cash provided by financing activities	29,178	1,821,395
Effect of exchange rate changes on cash and cash equivalents	(6,402)	(2,375)
Net change in cash and cash equivalents	(1,904)	46,768
Cash and cash equivalents at beginning of period	70,742	25,155
Cash and cash equivalents at end of period	\$ 68,838	\$ 71,923
Supplemental cash flow information:		
Cash paid for taxes	\$ 21,005	\$ 10,740
Cash paid for interest	\$ 118,793	\$ 56,932
Non-cash investing activity:		
Capital expenditures acquired on account but unpaid as of the period end	\$ 12,924	\$ 14,875
Non-cash financing activity:		

Equity consideration for the Business Combination	\$	—	\$	910,800
Debt assumed in the Business Combination	\$	—	\$	22,911
Debt assumed in the Acquisition	\$	16,609	\$	—

See accompanying notes to condensed consolidated financial statements.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

1. Background and Basis of Presentation:

Description of Business

PQ Group Holdings Inc. and subsidiaries (the “Company” or “PQ Group Holdings”) conducts operations through two principal segments: (1) Performance Materials & Chemicals: a fully integrated, global leader in silicate technology, producing sodium silicate, specialty silicas, zeolites, spray dry silicates, magnesium silicate, and other high performance chemical products used in a variety of end-uses such as adsorbents for surface coatings, clarifying agents for beverages, cleaning and personal care products and engineered glass products for use in highway safety, polymer additives, metal finishing and electronics end uses; and (2) Environmental Catalysts & Services: a leading global innovator and producer of silica catalysts used in the production of high-density polyethylene (“HDPE”), methyl methacrylate (“MMA”), specialty zeolite-based catalysts sold to the emissions control industry, the petrochemical industry and other areas of the broader chemicals industry and a merchant sulfuric acid producer operating a network of plants serving a variety of end uses, including the oil refining, nylon, mining, general industrial and chemical industries.

The Company experiences some seasonality, primarily with respect to the performance materials and refining services product groups. With respect to the performance materials product group, sales and earnings are generally higher during the second and third quarters of the year as highway striping projects typically occur during warmer weather months. Additionally, the refining services product group typically experiences similar seasonal fluctuations as a result of higher demand for gasoline products in the summer months. As a result, working capital requirements tend to be higher in the first and fourth quarters of the year, while higher cash generation occurs in the second and third quarters of the year.

Basis of Presentation

On August 17, 2015, the Company, PQ Holdings Inc. (“PQ Holdings”), Eco Services Operations LLC (“Eco Services”), certain investment funds affiliated with CCMP Capital Advisors, LLC (now known as CCMP Capital Advisors, LP; “CCMP”), and stockholders of PQ Holdings and Eco Services entered into a reorganization and transaction agreement pursuant to which the companies consummated a series of transactions to reorganize and combine the businesses of PQ Holdings and Eco Services (the “Business Combination”), under a new holding company, PQ Group Holdings Inc. The Business Combination was consummated on May 4, 2016.

In accordance with accounting principles generally accepted in the United States (“GAAP”), Eco Services is the accounting predecessor to PQ Group Holdings. Certain investment funds affiliated with CCMP held a controlling interest position in Eco Services prior to the Business Combination. In addition, certain investment funds affiliated with CCMP owned a non-controlling interest in PQ Holdings prior to the Business Combination and the merger with Eco Services constituted a change in control under the PQ Holdings credit agreements and bond indenture that were in place at the time of the Business Combination. Therefore, Eco Services is deemed to be the accounting acquirer. These condensed consolidated financial statements are the continuation of Eco Services’ business prior to the Business Combination.

The condensed consolidated financial statements included herein are unaudited. Certain information and footnote disclosures normally included in annual financial statements prepared in accordance with GAAP have been condensed or omitted pursuant to such rules and regulations for interim reporting. In the opinion of management, all adjustments of a normal and recurring nature necessary to state fairly the financial position and results of operations have been included. The results of operations are not necessarily indicative of the results to be expected for the full year. The accompanying unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and related notes included in the Company’s prospectus dated September 28, 2017, as filed with the SEC pursuant to Rule 424(b) under the Securities Act of 1933, as amended. The Company has continued to follow the accounting policies set forth in those consolidated financial statements.

Prior to September 22, 2017, the Company had two classes of common stock designated as Class A and Class B common stock. On September 22, 2017, the Company reclassified its Class A common stock into common stock and then effected a 8.8275-for-1 split of its common stock. On September 28, 2017, the Company converted each outstanding share of Class B common stock into 8.8275 shares of common stock plus an additional number of shares determined by dividing the unreturned paid-in capital amount of such Class B common stock, or \$113.74 per share, by \$17.50, the initial public offering price of a share of our common stock in the Company’s initial public offering (“IPO”), rounded to the nearest whole share. Holders of Class B common stock did not receive any cash payments from the Company in connection with the conversion of the Class B common stock.

On October 3, 2017, the Company completed its IPO whereby it issued 29,000,000 shares of its common stock at an initial public offering price of \$17.50 per share. The shares began trading on the New York Stock Exchange on September 29, 2017. The aggregate

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

proceeds received by the Company from the offering were approximately \$480,525, net of underwriting discounts, commissions and estimated offering expenses. The net proceeds were used to repay existing indebtedness as further described in Note 20.

2. New Accounting Standards:

Recently Adopted Accounting Standards

In October 2016, the Financial Accounting Standards Board (“FASB”) issued guidance which eliminates the deferral of the tax effects of intra-entity transfers of an asset other than inventory. Previous GAAP prohibited the recognition of current and deferred income taxes for an intra-entity asset transfer until the asset had been sold to an outside party which has resulted in diversity in practice and increased complexity within financial reporting. For public companies, the new guidance is effective for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years. The Company early adopted the guidance effective January 1, 2017. The guidance did not have a material impact on the Company’s consolidated financial statements.

In March 2016, the FASB issued guidance that includes targeted improvements to the accounting for employee stock-based compensation. The updates in the guidance include changes in the income tax consequences, balance sheet classification and cash flow statement reporting of stock-based payment transactions. The guidance also includes certain modifications applicable only to nonpublic entities. For public companies, the new guidance is effective for annual periods beginning after December 15, 2016, and interim periods within those years. The Company adopted this new guidance as required on January 1, 2017, with no material impact upon adoption to the Company’s consolidated financial statements. On a prospective basis from the adoption date, the Company will record all tax effects related to stock-based compensation through the statement of operations, and all tax-related cash flows resulting from stock-based award payments will be reported as operating activities in the statement of cash flows. The Company made an accounting policy election under the new guidance to account for forfeitures of stock-based compensation awards as they occur.

In July 2015, the FASB issued new guidance that changes the measurement principle for inventory from the lower of cost or market to the lower of cost or net realizable value. The amendments in this guidance do not apply to inventory that is measured using LIFO or the retail inventory method; rather, the amendments apply to all other inventory, which includes inventory that is measured using FIFO or average cost. Within the scope of this new guidance, an entity should measure inventory at the lower of cost or net realizable value. Net realizable value is defined as the estimated selling price in the ordinary course of business, less reasonably predictable costs of completion, disposal and transportation, which is consistent with existing GAAP. The Company adopted the new guidance on January 1, 2017 as required. The guidance did not have a material impact on the Company’s consolidated financial statements.

Accounting Standards Not Yet Adopted

In August 2017, the FASB issued amendments intended to better align hedge accounting with an entities risk management activities. The amendments expand hedge accounting for non-financial and financial risk components and revise the measurement methodologies to better align with an entities risk management activities. Separate presentation of hedge ineffectiveness is eliminated to provide greater transparency of the full impact of hedging by requiring presentation of the results of the hedged item and hedging instrument in a single financial statement line item. In addition, the amendments reduce complexity by simplifying the manner in which assessments of hedge effectiveness may be performed. The new guidance is effective for public companies for annual periods beginning after December 15, 2018, including interim periods within those years. Early adoption is permitted, and the new guidance should be applied prospectively to the presentation and disclosure guidance. The Company is evaluating the impact that the new guidance will have on its consolidated financial statements.

In May 2017, the FASB issued guidance to clarify which changes to the terms or conditions of a share-based payment award require an entity to apply modification accounting. Under the new guidance, an entity should not account for the effects of a change in a share-based payment award using modification accounting unless the fair value, vesting conditions and classification as either a liability or equity are all the same with respect to the award immediately prior to modification and the modified award itself. The new guidance is effective for annual periods beginning after December 15, 2017, including interim periods within those years. Early adoption is permitted, and the new guidance should be applied prospectively to awards modified on or after the adoption date. Based on the Company’s existing policies regarding the application of modification accounting to its share-based payment awards, the Company does not believe that the new guidance will have a material impact on its consolidated financial statements.

In March 2017, the FASB issued guidance to improve the presentation of net periodic pension cost and net periodic postretirement benefit cost (collectively, “pension costs”). Under current GAAP, there are several components of pension costs which are presented net to arrive at pension costs as included in the income statement and disclosed in the notes. As part of this amendment to the existing guidance, the service cost component of pension costs will be bifurcated from the other components and included in the same line item of the income statement as compensation costs are reported. The remaining components will be reported together below operating income on the income

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

statement, either as a separate line item or combined with another line item on the income statement and disclosed. Additionally, with respect to capitalization to inventory, fixed assets, etc., only the service cost component will be eligible for capitalization upon adoption of the guidance. The new guidance is effective for public companies for annual periods beginning after December 15, 2017, including interim periods within those years. Early adoption is permitted. The amendments should be applied retrospectively upon adoption with respect to the presentation of the service and other cost components of pension costs in the income statement, and prospectively for the capitalization of the service cost component in assets. The Company is evaluating the impact that the new guidance will have on its consolidated financial statements.

In January 2017, the FASB issued guidance which eliminates the second step from the traditional two-step goodwill impairment test. Under current guidance, an entity performed the first step of the goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount; if an impairment loss was indicated, the entity computed the implied fair value of goodwill to determine whether an impairment loss existed, and if so, the amount to recognize. Under the new guidance, an impairment loss is recognized for the amount by which the carrying amount exceeds the reporting unit's fair value (the Step 1 test), with no further testing required. Any impairment loss recognized is limited to the amount of goodwill allocated to the reporting unit. The new guidance is effective for public companies that are SEC registrants for fiscal years beginning after December 15, 2019, with early adoption permitted for goodwill impairment tests performed on testing dates after January 1, 2017. All entities are required to apply the guidance prospectively to goodwill impairment tests subsequent to adoption of the standard. The Company is evaluating the impact that the new guidance will have on its consolidated financial statements.

In January 2017, the FASB issued guidance which clarifies the definition of a business and provides revised criteria and a framework to determine whether an integrated set of assets and activities is a business. For public companies, the new guidance is effective for fiscal years beginning after December 15, 2017, including interim periods within those years. Early adoption is permitted. The Company is evaluating the impact that the new guidance will have on its consolidated financial statements.

In November 2016, the FASB issued guidance which clarifies the classification and presentation of changes in restricted cash on the statement of cash flows. The updates in the guidance require that the statement of cash flows explain the change during the period in the total of cash, cash equivalents and restricted cash when reconciling the beginning-of-period and end-of-period total amounts. The updates also require a reconciliation between cash, cash equivalents and restricted cash presented on the balance sheet to the total of the same amounts presented on the statement of cash flows. For public companies, the new guidance is effective for fiscal years beginning after December 15, 2017, and interim periods within those years. Early adoption is permitted, and the new guidance should be applied retrospectively to each period presented. The Company is evaluating the impact that the new guidance will have on its consolidated financial statements. As of September 30, 2017, the Company had \$1,645 of restricted cash included in prepaid and other current assets on its balance sheet related to its New Market Tax Credit financing arrangements as well as other small restricted cash balances.

In August 2016, the FASB issued guidance which clarifies the classification of certain cash receipts and cash payments in the statement of cash flows, including debt prepayment or extinguishment costs and distributions from certain equity method investees. For public companies, the new guidance is effective for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years. Early adoption is permitted, and the new guidance should be applied retrospectively to each period presented. The Company is evaluating the impact that the new guidance will have on its consolidated financial statements.

In February 2016, the FASB issued guidance that amends the accounting for leases. Under the new guidance, a lessee will recognize assets and liabilities for most leases (including those classified under existing GAAP as operating leases, which based on current standards are not reflected on the balance sheet), but will recognize expenses similar to current lease accounting. For public companies, the new guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those years. Early adoption is permitted. The new guidance must be adopted using a modified retrospective transition and provides for certain practical expedients. The Company is currently evaluating the impact that the new guidance will have on its consolidated financial statements. The Company has operating lease agreements for which it expects to recognize right of use assets and corresponding liabilities on its balance sheet upon adoption of the new guidance. A complete discussion of these leases is included in the Company's audited consolidated financial statements for the year ended December 31, 2016 in Note 20, Commitments and Contingent Liabilities.

In May 2014, the FASB issued accounting guidance (with subsequent targeted amendments) that will significantly enhance comparability of revenue recognition practices across entities, industries, jurisdictions and capital markets. The core principle of the guidance is that revenue recognized from a transaction or event that arises from a contract with a customer should reflect the consideration to which an entity expects to be entitled in exchange for goods or services provided. To achieve that core principle, the new guidance sets forth a five-step revenue recognition model that will need to be applied consistently to all contracts with customers, except those that are within the scope of other topics in the Accounting Standards Codification ("ASC"). Also required are enhanced disclosures to help users of financial statements better understand the nature, amount, timing and uncertainty of revenues and cash flows from contracts with customers. The enhanced disclosures include qualitative and quantitative information about contracts with customers, significant

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

judgments made in applying the revenue guidance, and assets recognized related to the costs to obtain or fulfill a contract. For public companies, the new requirements are effective for annual reporting periods beginning after December 15, 2017, including interim periods within those years. The Company is reviewing its key revenue streams and assessing the underlying customer contracts within the framework of the new guidance. The Company has evaluated the key aspects of its revenue streams for impact under the new guidance and is currently performing a detailed analysis of its customer agreements to quantify the potential changes under the guidance. The Company believes that the guidance will not have a material impact on its existing revenue recognition practices, but there are new robust disclosure requirements that will have an impact on the Company's reporting. The Company anticipates adopting the new guidance in the first quarter of 2018 as required, and expects to implement the guidance under the modified retrospective transition method of adoption.

3. Fair Value Measurements:

Fair values are based on quoted market prices when available. When market prices are not available, fair values are generally estimated using discounted cash flow analyses, incorporating current market inputs for similar financial instruments with comparable terms and credit quality. In instances where there is little or no market activity for the same or similar instruments, the Company estimates fair values using methods, models and assumptions that management believes a hypothetical market participant would use to determine a current transaction price. These valuation techniques involve some level of management estimation and judgment that becomes significant with increasingly complex instruments or pricing models. Where appropriate, adjustments are included to reflect the risk inherent in a particular methodology, model or input used.

The Company's financial assets and liabilities carried at fair value have been classified based upon a fair value hierarchy. The hierarchy gives the highest ranking to fair values determined using unadjusted quoted prices in active markets for identical assets and liabilities (Level 1) and the lowest ranking to fair values determined using methodologies and models with unobservable inputs (Level 3). The classification of an asset or a liability is based on the lowest level input that is significant to its measurement. For example, a Level 3 fair value measurement may include inputs that are both observable (Levels 1 and 2) and unobservable (Level 3). The levels of the fair value hierarchy are as follows:

- Level 1—Values are unadjusted quoted prices for identical assets and liabilities in active markets accessible at the measurement date. Active markets provide pricing data for trades occurring at least weekly and include exchanges and dealer markets.
- Level 2—Inputs include quoted prices for similar assets or liabilities in active markets, quoted prices from those willing to trade in markets that are not active, or other inputs that are observable or can be corroborated by market data for the term of the instrument. Such inputs include market interest rates and volatilities, spreads and yield curves.
- Level 3—Certain inputs are unobservable (supported by little or no market activity) and significant to the fair value measurement. Unobservable inputs reflect the Company's best estimate of what hypothetical market participants would use to determine a transaction price for the asset or liability at the reporting date.

The following table presents information about the Company's assets and liabilities that were measured at fair value on a recurring basis as of September 30, 2017 and December 31, 2016, and indicates the fair value hierarchy of the valuation techniques the Company utilized to determine such fair value.

	As of September 30, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Derivative contracts	\$ 1,098	\$ —	\$ 1,098	\$ —
Restoration plan assets	5,566	5,566	—	—
Total	\$ 6,664	\$ 5,566	\$ 1,098	\$ —
Liabilities:				
Derivative contracts	\$ 58	\$ —	\$ 58	\$ —

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

	As of December 31, 2016	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Derivative contracts	\$ 6,434	\$ —	\$ 6,434	\$ —
Restoration plan assets	5,594	5,594	—	—
Total	<u>\$ 12,028</u>	<u>\$ 5,594</u>	<u>\$ 6,434</u>	<u>\$ —</u>

Restoration plan assets

The fair values of the Company's restoration plan assets are determined through quoted prices in active markets. Restoration plan assets are assets held in a Rabbi trust to fund the obligations of the Company's defined benefit supplementary retirement plans and include various stock and fixed income mutual funds. See Note 15 to these condensed consolidated financial statements regarding defined supplementary retirement plans.

Derivative contracts

Derivative assets and liabilities can be exchange-traded or traded over-the-counter ("OTC"). The Company generally values exchange-traded derivatives using models that calibrate to market transactions and eliminate timing differences between the closing price of the exchange-traded derivatives and their underlying instruments. OTC derivatives are valued using market transactions and other market evidence whenever possible, including market-based inputs to models, model calibration to market transactions, broker or dealer quotations or alternative pricing sources with reasonable levels of price transparency. When models are used, the selection of a particular model to value an OTC derivative depends on the contractual terms of, and specific risks inherent in, the instrument as well as the availability of pricing information in the market. The Company generally uses similar models to value similar instruments. Valuation models require a variety of inputs, including contractual terms, market prices and rates, forward curves, measures of volatility, and correlations of such inputs. For OTC derivatives that trade in liquid markets, such as forward contracts, swaps and options, model inputs can generally be corroborated by observable market data by correlation or other means, and model selection does not involve significant management judgment.

The Company has interest rate caps and natural gas caps and swaps that are fair valued using Level 2 inputs. In addition, the Company applies a credit valuation adjustment to reflect credit risk which is calculated based on credit default swaps. To the extent that the Company's net exposure under a specific master agreement is an asset, the Company utilizes the counterparty's default swap rate. If the net exposure under a specific master agreement is a liability, the Company utilizes a default swap rate comparable to PQ Group Holdings. The credit valuation adjustment is added to the discounted fair value to reflect the exit price that a market participant would be willing to receive to assume the Company's liabilities or that a market participant would be willing to pay for the Company's assets. As of September 30, 2017 and December 31, 2016, the credit valuation adjustment resulted in a minimal change in the fair value of the derivatives.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

4. Accumulated Other Comprehensive Income (Loss):

The following table presents the tax effects of each component of other comprehensive income (loss) for the three and nine months ended September 30, 2017 and 2016:

	Three months ended September 30,					
	2017			2016		
	Pre-tax amount	Tax benefit / (expense)	After-tax amount	Pre-tax amount	Tax benefit / (expense)	After-tax amount
Defined benefit and other postretirement plans						
Amortization and unrealized losses	\$ (33)	\$ 13	\$ (20)	\$ 162	\$ —	\$ 162
Benefit plans, net	(33)	13	(20)	162	—	162
Net loss (gain) from hedging activities	(486)	185	(301)	324	(123)	201
Foreign currency translation	21,343	(2,493)	18,850	1,930	(644)	1,286
Other comprehensive income (loss)	<u>\$ 20,824</u>	<u>\$ (2,295)</u>	<u>\$ 18,529</u>	<u>\$ 2,416</u>	<u>\$ (767)</u>	<u>\$ 1,649</u>

	Nine months ended September 30,					
	2017			2016		
	Pre-tax amount	Tax benefit / (expense)	After-tax amount	Pre-tax amount	Tax benefit / (expense)	After-tax amount
Defined benefit and other postretirement plans						
Amortization and unrealized losses	\$ (261)	\$ 38	\$ (223)	\$ 486	\$ —	\$ 486
Benefit plans, net	(261)	38	(223)	486	—	486
Net loss (gain) from hedging activities	(5,373)	2,047	(3,326)	2,100	(798)	1,302
Foreign currency translation	69,202	(8,710)	60,492	(9,605)	1,686	(7,919)
Other comprehensive income (loss)	<u>\$ 63,568</u>	<u>\$ (6,625)</u>	<u>\$ 56,943</u>	<u>\$ (7,019)</u>	<u>\$ 888</u>	<u>\$ (6,131)</u>

The following table presents the change in accumulated other comprehensive income (loss), net of tax, by component for the nine months ended September 30, 2017 and 2016:

	Defined benefit and other postretirement plans	Net gain (loss) from hedging activities	Foreign currency translation	Total
December 31, 2016	\$ 7,513	\$ 4,557	\$ (65,781)	\$ (53,711)
Other comprehensive income (loss) before reclassifications	(322)	(3,404)	60,238	56,512
Amounts reclassified from accumulated other comprehensive income ^(a)	99	78	—	177
Net current period other comprehensive income (loss)	(223)	(3,326)	60,238	56,689
September 30, 2017	<u>\$ 7,290</u>	<u>\$ 1,231</u>	<u>\$ (5,543)</u>	<u>\$ 2,978</u>
December 31, 2015	\$ 648	\$ —	\$ —	\$ 648
Other comprehensive income (loss) before reclassifications	486	591	(7,306)	(6,229)
Amounts reclassified from accumulated other comprehensive income ^(a)	—	711	—	711
Net current period other comprehensive income (loss)	486	1,302	(7,306)	(5,518)
September 30, 2016	<u>\$ 1,134</u>	<u>\$ 1,302</u>	<u>\$ (7,306)</u>	<u>\$ (4,870)</u>

^(a) See the following table for details about these reclassifications.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

The following table presents the reclassifications out of accumulated other comprehensive income (loss) for the three and nine months ended September 30, 2017 and 2016. Amounts in parenthesis indicate debits to profit/loss.

Details about Accumulated Other Comprehensive Income Components	Amount Reclassified from Accumulated Other Comprehensive Income				Affected Line Item in the Statement Where Net Income is Presented
	Three months ended September 30,		Nine months ended September 30,		
	2017	2016	2017	2016	
Defined benefit and other postretirement plans					
Amortization of prior service cost	\$ 20	\$ —	\$ 60	\$ —	(a)
Amortization of net gain (loss)	19	—	58	—	(a)
	39	—	118	—	Total before tax
	(6)	—	(19)	—	Tax (expense) benefit
	<u>\$ 33</u>	<u>\$ —</u>	<u>\$ 99</u>	<u>\$ —</u>	Net of tax
Net gain (loss) from hedging activities					
Interest rate caps	\$ 13	\$ (2)	\$ 22	\$ (2)	Interest expense
Natural gas swaps	94	420	104	1,148	Cost of goods sold
	107	418	126	1,146	Total before tax
	(41)	(159)	(48)	(435)	Tax (expense) benefit
	<u>\$ 66</u>	<u>\$ 259</u>	<u>\$ 78</u>	<u>\$ 711</u>	Net of tax
Total reclassifications for the period	<u>\$ 99</u>	<u>\$ 259</u>	<u>\$ 177</u>	<u>\$ 711</u>	Net of tax

^(a) These accumulated other comprehensive income (loss) components are included in the computation of net periodic pension and other postretirement cost (see Note 15 to these condensed consolidated financial statements for additional details).

5. Acquisition:

On June 12, 2017 (the “Closing Date”), the Company acquired the facilities of Sovitec Mondial S.A. (“Sovitec”) located in Belgium, Spain, Argentina and France as part of a stock transaction (the “Acquisition”) for \$41,572 in cash, excluding assumed debt. Based in Fleurus, Belgium, Sovitec is a high quality producer of engineered glass products used in transportation safety, metal finishing and polymer additives.

The Acquisition was accounted for using the acquisition method of accounting. Under the acquisition method, the purchase price was allocated to the identifiable net assets acquired based on the fair values of the identifiable assets acquired and liabilities assumed as of the Closing Date. The excess of the purchase price over the fair values of the identifiable net assets acquired was recorded to goodwill.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

The following table sets forth the calculation and preliminary allocation of the purchase price to the identifiable net assets acquired with respect to the Acquisition:

Total consideration, net of cash acquired	\$	41,572
Recognized amounts of identifiable assets acquired and liabilities assumed:		
Receivables	\$	14,305
Inventories		7,645
Prepaid and other current assets		230
Property, plant and equipment		9,020
Other long-term assets		129
Fair value of assets acquired		31,329
Current debt		(6,420)
Accounts payable		(10,748)
Long-term debt		(10,189)
Other long-term liabilities		(154)
Fair value of net assets acquired		3,818
Goodwill		37,754
	\$	41,572

The valuation of the identifiable assets and liabilities included in the table above is preliminary and is subject to change, as the Company is in the process of evaluating the information required to determine the fair values of certain identifiable assets and liabilities acquired, including inventory, property, plant and equipment, and intangible assets. An increased portion of the purchase price allocated to the identifiable net assets acquired will reduce the amount recognized for goodwill and may result in increased cost of goods sold, depreciation and/or amortization expense. Adjustments to the provisional amounts during the measurement period that result in changes to depreciation, amortization or other income effects will be recognized in the reporting period(s) in which the adjustments are determined.

The Company's condensed consolidated financial statements include Sovitec's results of operations for the period from the Closing Date through September 30, 2017. Net sales and net income attributable to Sovitec during this period are included in the Company's condensed consolidated statement of operations and total \$13,490 and \$644, respectively, for the three months ended September 30, 2017, and \$17,194 and \$1,148, respectively, for the nine months ended September 30, 2017. Acquisition costs of \$737 and \$2,065 are included in other operating expense, net in the Company's condensed consolidated statement of operations for the three and nine months ended September 30, 2017, respectively.

The Company believes that the Acquisition will enable it to offer a more comprehensive, cost-effective and high-quality portfolio of products and services to its customers worldwide when, combined with anticipated synergies within its existing business, contributed to a total purchase price that resulted in the recognition of goodwill. All of the goodwill was assigned to the Company's Performance Materials and Chemicals segment. The goodwill associated with the Acquisition is not deductible for tax purposes.

Pro Forma Financial Information

The unaudited pro forma financial information for the three months ended September 30, 2016 and the nine months ended September 30, 2017 and 2016 has been derived from the Company's historical consolidated financial statements and prepared to give effect to the Acquisition, assuming that the Acquisition occurred on January 1, 2016. The unaudited pro forma consolidated results of operations are provided for illustrative purposes only and are not indicative of the Company's actual consolidated results of operations had the Acquisition been made as of January 1, 2016. The unaudited pro forma results of operations do not reflect any operating efficiencies or potential cost savings which may result from the Acquisition. The results of operations for the three months ended September 30, 2017 include the operating results of the combined company for the full period and therefore, there is no pro forma presentation included in the table below.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

	Three months ended September 30,		Nine months ended September 30,	
	2016	2017	2016	
		(unaudited)		
Pro forma sales	\$ 381,065	\$ 1,130,454	\$	772,549
Pro forma net loss	(8,289)	(6,511)		(88,300)

Certain non-recurring charges included in the Company's results of operations for the nine months ended September 30, 2017 were allocated to the respective prior year periods for pro forma purposes. For the nine months ended September 30, 2017, non-recurring charges allocated to the prior year period include transaction fee charges of \$2,065 which were excluded from the pro forma net loss for the nine months ended September 30, 2017.

6. Business Combination:

As described in Note 1 to these condensed consolidated financial statements, on May 4, 2016, the Company, PQ Holdings, Eco Services, certain investment funds affiliated with CCMP and certain other stockholders of PQ Holdings and Eco Services completed the Business Combination. Eco Services is the accounting predecessor to PQ Group Holdings. Certain investment funds affiliated with CCMP held a controlling interest position in Eco Services prior to the Business Combination. In addition, certain investment funds affiliated with CCMP owned a noncontrolling interest in PQ Holdings prior to the Business Combination and the merger with Eco constituted a change in control under the various PQ Holdings credit agreements and bond indenture. Therefore, Eco Services is deemed to be the accounting acquirer. These condensed consolidated financial statements are the continuation of Eco Services' business prior to the Business Combination.

Total consideration for the Business Combination included \$1,777,740 of cash, \$910,800 of equity in the acquired PQ Holdings entities and \$1,401 of assumed stock awards of PQ Holdings. The fair value of the equity consideration was determined based on an estimated enterprise value using a market approach as of the date of the Business Combination, reduced by borrowings to arrive at the fair value of equity. The existing PQ Holdings credit facilities were not legally assumed as part of the Business Combination and the extinguishment of the debt concurrent with the Business Combination was included as part of the consideration transferred.

The Company's condensed consolidated financial statements include PQ Holdings results of operations from May 4, 2016 through September 30, 2016. Net sales and net loss attributable to PQ Holdings during this period are included in the Company's condensed consolidated statement of operations and total \$276,726 and \$29,070 for the three months ended September 30, 2016 and \$462,097 and \$122,497 for the nine months ended September 30, 2016. Acquisition costs of \$896 and \$1,398 are included in other operating expense, net in the Company's consolidated statement of operations for the three and nine months ended September 30, 2016, respectively.

In accordance with the requirements of the purchase method of accounting for acquisitions, inventories were recorded at fair market value (which is defined as estimated selling prices less the sum of (a) costs of disposal and (b) a reasonable profit allowance for the selling effort of the acquiring entity), which was \$58,683 higher than the historical cost. The Company's cost of goods sold includes a pre-tax charge of \$5,804 and \$23,518 for the three and nine months ended September 30, 2016, respectively, relating to the portion of the step-up on inventory sold during the period. A separate portion of the fair value step-up related to the domestic inventory accounted for under the LIFO method was included in inventory on the consolidated balance sheet as of December 31, 2016 as part of the new LIFO base layer on the acquired inventory.

Pro Forma Financial Information

The unaudited pro forma financial information for the nine months ended September 30, 2016 has been derived from the Company's historical consolidated financial statements and prepared to give effect to the Business Combination, assuming that the Business Combination occurred on January 1, 2015. These pro forma adjustments primarily relate to incremental depreciation expense on the step up of fixed assets, amortization of acquired intangibles, higher cost of goods sold related to the sale of revalued inventory, incremental interest expense related to the additional debt that needed to fund the Business Combination, and the estimated impact of these adjustments on the Company's tax provision. The unaudited pro forma consolidated results of operations are provided for illustrative purposes only and are not indicative of the Company's actual consolidated results of operations had the Business Combination been made as of January 1, 2015. The unaudited pro forma results of operations do not reflect any operating efficiencies or potential cost savings which may result from the Business Combination. The results of operations for the three months ended September 30, 2016 include the operating results of the combined company for the full period and therefore, there is no pro forma presentation included in the table below.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

	Nine months ended September 30, 2016
	(unaudited)
Pro forma sales	\$ 1,080,310
Pro forma net loss	(55,985)

Certain non-recurring charges included in the Company's results of operations for the nine months ended September 30, 2016 were allocated to the respective prior year periods for pro forma purposes. For the nine months ended September 30, 2016, non-recurring charges allocated to the prior year period include a debt prepayment penalty of \$26,250, refinancing charges of \$4,616 and transaction fee charges of \$714, all of which are excluded from the pro forma net loss for the nine months ended September 30, 2016.

7. Goodwill

The changes in the carrying amount of goodwill for the nine months ended September 30, 2017 is summarized as follows:

	Performance Materials & Chemicals	Environmental Catalysts & Services	Total
Balance as of December 31, 2016	\$ 852,506	\$ 388,923	\$ 1,241,429
Goodwill recognized	37,754	—	37,754
Foreign exchange impact	25,189	2,175	27,364
Balance as of September 30, 2017	\$ 915,449	\$ 391,098	\$ 1,306,547

8. Other Operating Expense, Net:

A summary of other operating expense, net is as follows:

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Restructuring and other related costs (Note 18)	\$ 4,106	\$ 1,336	\$ 5,578	\$ 10,898
Amortization expense	9,146	8,914	23,270	17,029
Net loss on asset disposals	3,494	627	6,419	2,288
Transaction and other related costs ⁽¹⁾	966	1,635	5,295	6,063
Management advisory fees	1,250	1,250	3,750	2,333
Other, net	871	1,280	2,844	2,019
	\$ 19,833	\$ 15,042	\$ 47,156	\$ 40,630

⁽¹⁾ Transaction and other related costs primarily include acquisition costs directly attributable to the Acquisition (see Note 5 to these condensed consolidated financial statements for further information) and the Business Combination (see Note 6 to these condensed consolidated financial statements for further information), as well as other business development costs.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

9. Inventories:

Inventories are classified and valued as follows:

	September 30, 2017	December 31, 2016
Finished products and work in process	\$ 178,844	\$ 175,182
Raw materials	57,077	51,866
	<u>\$ 235,921</u>	<u>\$ 227,048</u>
Valued at lower of cost or market:		
LIFO basis	\$ 145,905	\$ 135,605
FIFO or average cost basis	90,016	91,443
	<u>\$ 235,921</u>	<u>\$ 227,048</u>

10. Investments in Affiliated Companies:

The Company accounts for investments in affiliated companies under the equity method. Affiliated companies accounted for on the equity basis as of September 30, 2017 are as follows:

Company	Country	Percent Ownership
PQ Silicates Ltd.	Taiwan	50%
Zeolyst International	USA	50%
Zeolyst C.V.	Netherlands	50%
Quaker Holdings	South Africa	49%

Following is summarized information of the combined investments:

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Net sales	\$ 83,983	\$ 63,110	\$ 225,770	\$ 107,897
Gross profit	33,276	24,283	91,862	46,589
Operating income	22,713	15,054	60,408	30,708
Net income	23,819	15,351	63,663	30,994

The Company's investments in affiliated companies balance as of September 30, 2017 and December 31, 2016 includes net purchase accounting fair value adjustments of \$266,358 and \$273,300, respectively, related to the Business Combination, consisting primarily of goodwill and intangible assets such as customer relationships, technical know-how and trade names. Consolidated equity in net income from affiliates is net of \$1,660 and \$6,942 of amortization expense related to purchase accounting fair value adjustments for the three and nine months ended September 30, 2017, respectively. Consolidated equity in net income from affiliates is net of \$12,291 and \$24,606 of amortization expense related to purchase accounting fair value adjustments for the three and nine months ended September 30, 2016, respectively.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

11. Property, Plant and Equipment:

A summary of property, plant and equipment, at cost, and related accumulated depreciation is as follows:

	September 30, 2017	December 31, 2016
Land	\$ 191,917	\$ 186,327
Buildings	191,916	157,944
Machinery and equipment	955,779	788,175
Construction in progress	155,005	204,138
	1,494,617	1,336,584
Less: accumulated depreciation	(285,570)	(155,196)
	<u>\$ 1,209,047</u>	<u>\$ 1,181,388</u>

Depreciation expense was \$31,957 and \$30,305 for the three months ended September 30, 2017 and 2016, respectively. Depreciation expense was \$89,987 and \$60,173 for the nine months ended September 30, 2017 and 2016, respectively.

12. Long-term Debt:

The summary of long-term debt is as follows:

	September 30, 2017	December 31, 2016
Term Loan Facility (U.S. dollar denominated)	\$ 918,473	\$ 925,430
Term Loan Facility (Euro denominated)	331,368	297,317
6.75% Senior Secured Notes due 2022	625,000	625,000
Floating Rate Senior Unsecured Notes due 2022	525,000	525,000
8.5% Senior Notes due 2022	200,000	200,000
ABL Facility	35,000	—
Other	68,207	45,223
Total debt	2,703,048	2,617,970
Original issue discount	(26,470)	(28,497)
Deferred financing costs	(24,842)	(27,275)
Total debt, net of original issue discount and deferred financing costs	2,651,736	2,562,198
Less: current portion	(54,255)	(14,481)
Total long-term debt	<u>\$ 2,597,481</u>	<u>\$ 2,547,717</u>

The fair value of a financial instrument is the amount at which the instrument could be exchanged in a current transaction. As of September 30, 2017 and December 31, 2016, the fair value of the senior secured term loans and senior secured and unsecured notes was higher than book value by \$9,936 and \$68,477, respectively. The fair value of the senior secured term loans and senior secured and unsecured notes was derived from published loan prices as of September 30, 2017 and December 31, 2016, as applicable. The fair value is classified as Level 2 based upon the fair value hierarchy (see Note 3 to these condensed consolidated financial statements for further information on fair value measurements).

New Markets Tax Credit Financing

On June 22, 2017, the Company's subsidiary, Potters Industries, LLC ("Potters"), entered into a New Markets Tax Credit ("NMTC") financing arrangement with U.S. Bank N.A. ("USB"), one of USB's affiliates ("USB Investment Fund") and Business Conduit No. 28, LLC, an affiliate of Community Reinvestment Fund, Inc. ("CRF"). USB contributed \$3,054 to USB Investment Fund, and Potters Leveraged Lender LLC, an indirect subsidiary of the Company, lent USB Investment Fund \$6,221. USB Investment Fund then contributed \$9,000 to CRF, which in turn lent \$8,820 to Potters pursuant to a credit agreement (the "June 2017 NMTC Agreement"). Potters used the \$8,820 in proceeds to acquire equipment for the expansion of Potters' manufacturing facility in Paris, Texas. The June 2017 NMTC Agreement provides the Company with certain monetary benefits as an offset to specifically identified capital expenditures. The June

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

2017 NMTC Agreement requires that certain commitments and covenants are maintained over a period of seven years in order to legally recognize the benefit. The \$8,820 was outstanding as of September 30, 2017. The capital expenditures associated with the June 2017 NMTC Agreement are expected to be completed in 2017.

In connection with the June 2017 NMTC Agreement, the Company provided an indemnification related to its actions or inactions which cause either a NMTC disallowance or recapture event. In the event that the Company causes either a recapture or disallowance of the tax credits expected to be generated under this program, then the Company will be required to repay the disallowed or recaptured tax credits plus an amount sufficient to pay the taxes on such repayment to the counterparty of the agreement. This indemnification covers the Company's actions and inactions prior to June 22, 2024. The maximum potential amount of future payments under this indemnification is approximately \$3,682. The Company currently believes that the likelihood of a required payment under this indemnification is remote.

Term Loans Repricing

On August 7, 2017, the Company re-priced the existing \$927,750 U.S. dollar-denominated tranche and the existing €283,338 Euro-denominated tranche of its term loans to reduce the applicable interest rates. The terms of the facilities are substantially consistent following the re-pricing, except that borrowings under the term loans bear interest at a rate equal to the LIBOR rate plus a margin of 3.25% with respect to U.S. dollar-denominated LIBOR rate loans, and the EURIBOR rate plus a margin of 3.25% with respect to Euro-denominated EURIBOR rate loans. In addition, the LIBOR rate elected under the facilities is subject to a floor of 0% and the EURIBOR rate elected under the facilities is subject to a floor of 0.75%.

Senior Unsecured Notes Partial Repayment

Subsequent to September 30, 2017 and in conjunction with the Company's IPO, on October 3, 2017, the Company repaid \$446,208, in aggregate principal of the \$525,000 of PQ Corporation's Floating Rate Senior Unsecured Notes due 2022 using the proceeds from the IPO. In connection with the repayment, the Company also paid accrued interest of \$2,693 and applicable redemption premiums of \$32,284.

13. Financial Instruments:

The Company uses interest rate related derivative instruments to manage its exposure related to changes in interest rates on its variable-rate debt instruments and uses commodity derivatives to manage its exposure to commodity price fluctuations. The Company does not speculate using derivative instruments.

By using derivative financial instruments to hedge exposures to changes in interest rates and commodity prices, the Company exposes itself to credit risk and market risk. Credit risk is the failure of the counterparty to perform under the terms of the derivative contract. When the fair value of a derivative contract is an asset, the counterparty owes the Company, which creates credit risk for the Company. When the fair value of a derivative contract is a liability, the Company owes the counterparty and, therefore, the Company is not exposed to the counterparty's credit risk in those circumstances. The Company minimizes counterparty credit risk in derivative instruments by entering into transactions with high quality counterparties. The derivative instruments entered into by the Company do not contain credit-risk-related contingent features.

Market risk is the adverse effect on the value of a derivative instrument that results from a change in interest rates, currency exchange rates, or commodity prices. The market risk associated with interest rate and commodity price contracts is managed by establishing and monitoring parameters that limit the types and degree of market risk that may be undertaken.

Use of Derivative Financial Instruments to Manage Commodity Price Risk. The Company is exposed to risks in energy costs due to fluctuations in energy prices, particularly natural gas. The Company has a hedging program in the United States which allows the Company to mitigate exposure to natural gas volatility with natural gas swap agreements. Fair value is determined based on estimated amounts that would be received or paid to terminate the contracts at the reporting date based on quoted market prices of comparable contracts. The respective current and non-current liabilities are recorded in accrued liabilities and other long-term liabilities and the respective current and non-current assets are recorded in prepaid and other current assets and other long-term assets, as applicable. As the derivatives are highly effective and are designated and qualify as cash-flow hedges, the related unrealized gains or losses are recorded in stockholders' equity as a component of other comprehensive income (loss), net of tax. Realized gains and losses on natural gas hedges are included in production cost and subsequently charged to cost of goods sold in the consolidated statements of operations in the period in which inventory is sold. The Company's natural gas swaps have a remaining notional quantity of 690,000 MMBTU to mitigate commodity price volatility through December 2018.

Use of Derivative Financial Instruments to Manage Interest Rate Risk. The Company is exposed to fluctuations in interest rates on its senior secured credit facilities and senior unsecured notes. Changes in interest rates will not affect the market value of such debt but will affect the amount of our interest payments over the term of the loans. Likewise, an increase in interest rates could have a material

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

impact on the Company's cash flow. The Company hedges the interest rate fluctuations on debt obligations through interest rate cap agreements. The Company records these agreements at fair value as assets or liabilities. As the derivatives are highly effective and are designated and qualify as cash-flow hedges, the related unrealized gains or losses are deferred in stockholders' equity as a component of other comprehensive income (loss), net of tax. Fair value is determined based on estimated amounts that would be received or paid to terminate the contracts at the reporting date based on quoted market prices.

In July 2016, the Company entered into interest rate cap agreements, paying a premium of \$1,551 to mitigate interest rate volatility from July 2016 through July 2020 by employing varying cap rates, ranging from 1.50% to 3.00% on \$1,000,000 of notional variable-rate debt.

The fair values of derivative instruments held as of September 30, 2017 and December 31, 2016 are shown below:

	Balance sheet location	September 30, 2017	December 31, 2016
Asset derivatives:			
Derivatives designated as cash flow hedges:			
Natural gas swaps	Current assets	\$ —	\$ 573
Interest rate caps	Current assets	9	—
Natural gas swaps	Other long-term assets	7	58
Interest rate caps	Other long-term assets	1,082	5,803
Total asset derivatives		\$ 1,098	\$ 6,434
Liability derivatives:			
Derivatives designated as cash flow hedges:			
Natural gas swaps	Accrued liabilities	\$ 58	\$ —
Total liability derivatives		\$ 58	\$ —

The following tables show the effect of the Company's derivative instruments designated as hedges on other comprehensive income (loss) ("OCI") and the statement of income for the three and nine months ended September 30, 2017 and 2016:

		Three months ended September 30,			
		2017		2016	
Derivatives designated as cash flow hedges:	Location in Earnings	Amount of gain (loss) recognized in OCI on derivatives (effective portion)	Amount of gain (loss) reclassified from accumulated OCI into income (effective portion)	Amount of gain (loss) recognized in OCI on derivatives (effective portion)	Amount of gain (loss) reclassified from accumulated OCI into income (effective portion)
Interest rate caps	Interest expense	\$ (1,842)	\$ 13	\$ 212	\$ (2)
Natural gas swaps	Cost of goods sold	(28)	94	(306)	420
		\$ (1,870)	\$ 107	\$ (94)	\$ 418

		Nine months ended September 30,			
		2017		2016	
Derivatives designated as cash flow hedges:	Location in Earnings	Amount of gain (loss) recognized in OCI on derivatives (effective portion)	Amount of gain (loss) reclassified from accumulated OCI into income (effective portion)	Amount of gain (loss) recognized in OCI on derivatives (effective portion)	Amount of gain (loss) reclassified from accumulated OCI into income (effective portion)
Interest rate caps	Interest expense	\$ (4,712)	\$ 22	\$ 212	\$ (2)
Natural gas swaps	Cost of goods sold	(787)	104	(1,723)	1,148
		\$ (5,499)	\$ 126	\$ (1,511)	\$ 1,146

Amounts of unrealized losses in OCI that are expected to be reclassified to the consolidated statement of operations over the next twelve months are \$41 as of September 30, 2017.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

14. Income Taxes:

The effective income tax rate for the three months ended September 30, 2017 was 239.9% compared to 26.9% for the three months ended September 30, 2016. The effective income tax rate for the nine months ended September 30, 2017 was (304.2)% compared to (67.1)% for the nine months ended September 30, 2016. The Company's effective income tax rate fluctuates based primarily on changes in income mix, repatriation of income taxes from foreign subsidiaries and, for the comparative periods, the change in Eco Services' tax status.

Prior to the Business Combination on May 4, 2016, Eco Services was a single member limited liability company and taxed as a partnership for federal and state income tax purposes. As such, all income tax liabilities and/or benefits of Eco Services were passed through to its members. Because Eco Services was taxed as a partnership, it did not record deferred taxes on the basis difference on its financial statements. Following the Business Combination on May 4, 2016, Eco Services had a change in tax status and is now taxed as a C-Corporation subject to federal and state corporate level income taxes at prevailing corporate rates. Minimal taxes were recorded on the book losses incurred by Eco Services during the periods preceding the Business Combination included in the nine months ended September 30, 2016, causing the fluctuation to the Company's effective income tax rate in comparison to the taxes recorded for the nine months ended September 30, 2016.

The difference between the U.S. federal statutory income tax rate and the Company's effective income tax rate for 2017 was mainly due to the tax effect of the Company's foreign currency exchange loss recognized as a discrete item for the purpose of calculating the effective tax rate as well as the tax effect of repatriating foreign earnings back to the U.S. as dividends, partially offset by lower tax rates in foreign jurisdictions as compared to the U.S. federal tax rate, foreign withholding taxes, state taxes and non-deductible transaction costs.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

15. Benefit Plans:

The following information is provided for (1) the Company-sponsored defined benefit pension plans covering employees in the U.S. and certain employees at its foreign subsidiaries, (2) the Company-sponsored unfunded plans to provide certain health care benefits to retired employees in the U.S. and Canada, and (3) the Company's defined benefit supplementary retirement plans which provide benefits for certain U.S. employees in excess of qualified plan limitations.

Components of net periodic expense are as follows:

Defined Benefit Pension Plans

	U.S.		Foreign	
	Three months ended September 30,		Three months ended September 30,	
	2017	2016	2017	2016
Service cost	\$ 305	\$ 547	\$ 859	\$ 792
Interest cost	2,536	2,522	1,339	837
Expected return on plan assets	(3,061)	(3,104)	(1,111)	(769)
Net periodic expense (benefit)	\$ (220)	\$ (35)	\$ 1,087	\$ 860

	U.S.		Foreign	
	Nine months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Service cost	\$ 914	\$ 1,640	\$ 2,642	\$ 1,320
Interest cost	7,608	5,236	4,024	1,396
Expected return on plan assets	(9,183)	(6,176)	(3,329)	(1,283)
Net periodic expense (benefit)	\$ (661)	\$ 700	\$ 3,337	\$ 1,433

Supplemental Retirement Plans

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
	Interest cost	\$ 123	\$ 121	\$ 370
Net periodic expense	\$ 123	\$ 121	\$ 370	\$ 202

Other Postretirement Benefit Plans

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
	Service cost	\$ 5	\$ 9	\$ 15
Interest cost	40	53	122	110
Amortization of prior service credit	(19)	—	(58)	—
Amortization of net gain	(19)	—	(58)	—
Net periodic expense	\$ 7	\$ 62	\$ 21	\$ 138

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

16. Commitments and Contingent Liabilities:

There is a risk of environmental impact in chemical manufacturing operations. The Company's environmental policies and practices are designed to ensure compliance with existing laws and regulations and to minimize the possibility of significant environmental impact. The Company is also subject to various other lawsuits and claims with respect to matters such as governmental regulations, labor and other actions arising out of the normal course of business. No accrual for these matters currently exists, with the exception of those listed below, because management believes that the liabilities resulting from such lawsuits and claims are not probable or reasonably estimable.

The Company triggered the requirement of New Jersey's Industrial Site Recovery Act ("ISRA") statute with the PQ Holdings stock transfer/corporate merger in December 2004. As required under ISRA, a General Information Notice with respect to the Company's two New Jersey locations was filed with the New Jersey Department of Environmental Protection ("NJDEP") in December 2004 and again in July 2007. Based on an initial review of the facilities by the NJDEP in 2005, the Company estimated that \$500 would be required for contamination assessment and removal work of one specific contaminant (polychlorinated biphenyls) that exceeded applicable NJDEP standards at these facilities, and had recorded a reserve for such amount as of December 31, 2005. During subsequent years, it was determined that additional assessment, removal and remediation work would be required and the reserve was increased to cover the estimated cost of such work. In addition, during this period, work had been performed and the reserve was reduced for actual costs incurred for the assessment and remediation work. Work at the Carlstadt facility has been completed and is closed from an ISRA standpoint, but as of September 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$557 and \$700, respectively, for costs required for contamination assessment and removal work at Rahway. There may be additional costs related to the remediation of Rahway, but until further investigation takes place, the Company cannot reasonably estimate the amount of additional liability that may exist.

As part of a Delaware River Basin Commission ("DRBC") required Pollutant Minimization Plan ("PMP"), in July 2013, the Company's Chester facility conducted limited paint sampling for polychlorinated biphenyls ("PCBs"). Also, as part of demolition, repair and maintenance projects scheduled for the Company's Baltimore facility in 2014, the Company conducted limited paint sampling during the fall of 2013 for waste categorization purposes. Paint samples were analyzed for PCB Aroclor 1254, the specific PCB congener commonly used in the manufacture of paint until the late 1970s. The Company's analytical results indicated that PCB Aroclor 1254 is present in paint on some structures (e.g., piping, structural steel, tanks) in excess of the fifty (50) parts per million ("ppm") regulatory threshold. Under the Toxic Substances Control Act ("TSCA"), there is no requirement to test in use paint for PCB content. However, once PCB content is identified at concentrations at or above the regulatory threshold, absent specific approval from the U.S. Environmental Protection Agency ("EPA"), the PCB-containing paint is regulated as an unauthorized use of PCBs, and the paint must be addressed. The Company abated painted surfaces that have tested positive for PCBs at levels exceeding 50 ppm at Baltimore in 2015 and early 2016. Similar abatement of painted structures as necessary at Chester have also been substantially completed. Characterization studies to evaluate whether soils have been impacted at Baltimore have been initiated as required under the TSCA, and have yet to commence at Chester. As of September 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$236 and \$1,048, respectively, for the remediation costs of PCB impacted soils at the Company's facilities.

In 2011, the Company installed a Continuous Emissions Monitor ("CEM") to measure CO, NOx and Opacity emissions from a furnace at the Company's Chester facility in Pennsylvania, and the Company conducted Relative Accuracy Test Audits ("RATA") as part of its efforts to certify the CEM. On May 5, 2014, the Pennsylvania Department of Environmental Protection ("PADEP") officially notified the Company that it was certifying the CEM based on RATA test results dating back to November 2011 and instructed the Company to start entering data previously recorded by the CEM into the Agency's on-line database. During the third and fourth quarters of 2014, the Company officially entered data recorded from the CEM up until the second quarter of 2013. In November 2015, PADEP issued an Assessment of Civil Penalty in the amount of \$1,739 for alleged violations under the Pennsylvania Air Pollution Control Act during the period from August 11, 2011 through June 30, 2013. The Company appealed, and PADEP reduced the penalty assessment to \$1,550. After a hearing on the appeal, a Pennsylvania Environmental Hearing Board ("EHB") judge reduced the penalty assessment to \$215 in September 2017. The PADEP filed a motion to reconsider a portion of the EHB judge's decision and the EHB denied the PADEP's motion in October 2017. As of September 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$215 and \$1,500, respectively, associated with the PADEP penalty.

The Company has a manufacturing facility at Warrington, United Kingdom. Asbestos-containing building material is present at the site, and asbestos removal and insulation replacement initiatives are underway. As of September 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$573 and \$532, respectively, for costs related to this program.

In 2008, the Company sold the property of a manufacturing facility located in the United States to the local port authority. In 2009, the port authority commissioned an environmental investigation of portions of the property. In 2010, the port authority advised the Company of alleged soil and groundwater contamination on the property and alleged the Company liable for certain conditions. The Company received and reviewed the environmental investigation documentation and determined it may have liability with respect to

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

some, but not all, of the alleged contamination. As of September 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$839 and \$913, respectively, for costs related to this potential liability.

The Company has recorded a reserve of \$1,380 and \$1,776 as of September 30, 2017 and December 31, 2016, respectively, to address remaining subsurface remedial and wetlands/marsh management activities at the Company's Martinez, CA site. Although currently a sulfuric acid regeneration plant, the site originally was operated by Mountain Copper Company ("Mococo") as a copper smelter. Also, the site sold iron pyrite to various customers and allowed their customers to deposit waste iron pyrite cinder and slag on the site. The property is adjacent to Peyton Slough, where Mococo had a permitted discharge point from its process. In 1997, the San Francisco Bay Regional Water Quality Control Board ("RWQCB") required characterization and remediation of Peyton Slough for Copper, Zinc and Acidic Soils. Various remediation activities were undertaken and completed, and the site has received final concurrence from the Army Corps with respect to the completed work. The RWQCB has agreed that Eco Services has achieved the goals for vegetative cover, but the current marsh condition is not sustainable without continued operation of the tide gates. The Company is continuing to work with the RWQCB on a plan to involve the County and work towards development of an alliance for operating, maintaining and funding the tide gates in the future.

As of September 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$1,444 and \$1,755, respectively, for subsurface remediation and the Soil Vapor Extraction Project at the Company's Dominguez, CA site. In the 1980s and 1990s, the EPA and the Los Angeles Regional Water Quality Control Board conducted investigations of the site due to historic chlorinated pesticide and chlorinated solvent use. Soil and groundwater beneath the site were impacted by chlorinated solvents and associated breakdown products, petroleum hydrocarbons, chlorinated pesticides and metals. A Corrective Measures Plan approved in October 2011 requires (1) soil vapor extraction ("SVE") in affected areas, (2) covering of unpaved areas containing pesticide impacted soil, and (3) annual groundwater monitoring of the perched water-bearing zone. Installation of the SVE unit has been completed and startup has occurred. The California Department of Toxic Substances Control ("DTSC") has granted conditional approval of the Company's soil management, and monitoring and maintenance plans. Most recently, the DTSC is requiring the Company to delineate the PCE plume on the eastern boundary of the site. The Company has submitted an action plan to address this matter and is awaiting comments from the DTSC.

17. Reportable Segments:

Summarized financial information for the Company's (1) Performance Materials & Chemicals and (2) Environmental Catalysts & Services reportable segments is shown in the following table:

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Net sales:				
Performance Materials & Chemicals	\$ 277,072	\$ 256,219	\$ 765,781	\$ 429,867
Environmental Catalysts & Services ⁽¹⁾	115,541	114,271	350,814	312,490
Eliminations ⁽²⁾	(784)	(511)	(2,568)	(911)
Total	\$ 391,829	\$ 369,979	\$ 1,114,027	\$ 741,446
Segment Adjusted EBITDA: ⁽³⁾				
Performance Materials & Chemicals	\$ 65,885	\$ 64,604	\$ 184,741	\$ 111,178
Environmental Catalysts & Services ⁽⁴⁾	61,900	56,341	182,578	135,044
Total Segment Adjusted EBITDA⁽⁵⁾	\$ 127,785	\$ 120,945	\$ 367,319	\$ 246,222

(1) Excludes the Company's proportionate share of sales from the Zeolyst International and Zeolyst C.V. joint ventures (collectively, the "Zeolyst Joint Venture") accounted for using the equity method (see Note 10 to these condensed consolidated financial statements for further information). The proportionate share of sales is \$37,622 and \$28,184 for the three months ended September 30, 2017 and 2016, respectively. The proportionate share of sales is \$100,991 and \$48,461 for the nine months ended September 30, 2017 and 2016, respectively.

(2) The Company eliminates intersegment sales when reconciling to the Company's consolidated statements of operations.

(3) The Company defines Adjusted EBITDA as EBITDA adjusted for certain items as noted in the reconciliation below. Management evaluates the performance of its segments and allocates resources based on several factors, of which the primary measure is Adjusted EBITDA. Adjusted EBITDA should not be considered as an alternative to net income as an indicator of the Company's operating

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

performance. Adjusted EBITDA as defined by the Company may not be comparable with EBITDA or Adjusted EBITDA as defined by other companies.

- (4) The Adjusted EBITDA from the Zeolyst Joint Venture included in the environmental catalyst and services segment is \$14,398 for the three months ended September 30, 2017, which includes \$10,151 of equity in net income plus \$1,658 of amortization of investment in affiliate step-up plus \$2,563 of joint venture depreciation, amortization and interest. The Adjusted EBITDA from the Zeolyst Joint Venture included in the environmental catalyst and services segment is \$10,316 for the three months ended September 30, 2016, which includes \$4,683 of equity in net loss plus \$12,291 of amortization of investment in affiliate step-up plus \$2,690 of joint venture depreciation, amortization and interest. The Adjusted EBITDA from the Zeolyst Joint Venture included in the environmental catalyst and services segment is \$39,690 for the nine months ended September 30, 2017, which includes \$24,594 of equity in net income plus \$6,941 of amortization of investment in affiliate step-up plus \$8,073 of joint venture depreciation, amortization and interest. The Adjusted EBITDA from the Zeolyst Joint Venture included in the environmental catalyst and services segment is \$19,962 for the nine months ended September 30, 2016, which includes \$9,213 of equity in net loss plus \$24,606 of amortization of investment in affiliate step-up plus \$4,534 of joint venture depreciation, amortization and interest.
- (5) Total Segment Adjusted EBITDA differs from the Company's consolidated Adjusted EBITDA due to unallocated corporate expenses.

A reconciliation from net loss to Segment Adjusted EBITDA is as follows:

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Reconciliation of net loss attributable to PQ Group Holdings Inc. to Segment Adjusted EBITDA				
Net loss attributable to PQ Group Holdings Inc.	\$ (3,345)	\$ (10,017)	\$ (7,408)	\$ (90,410)
Provision for (benefit from) income taxes	5,172	(3,536)	5,269	36,013
Interest expense, net	49,079	48,610	144,041	94,362
Depreciation and amortization	45,929	43,611	129,135	85,602
Segment EBITDA	96,835	78,668	271,037	125,567
Unallocated corporate expenses	7,885	7,316	23,474	13,940
Joint venture depreciation, amortization and interest	2,563	2,690	8,073	4,534
Amortization of investment in affiliate step-up	1,660	12,291	6,942	24,606
Amortization of inventory step-up	—	5,804	871	23,518
Debt extinguishment costs	453	—	453	11,858
Losses on disposal of fixed assets	3,494	627	6,419	2,288
Foreign currency exchange losses	5,256	3,151	21,612	6,240
Non-cash revaluation of inventory, including LIFO	750	329	3,229	775
Management advisory fees	1,250	1,250	3,750	2,333
Transaction and other related costs	966	1,696	5,300	6,240
Equity-based and other non-cash compensation	1,041	1,137	3,869	4,916
Restructuring, integration and business optimization expenses	4,957	2,839	8,009	14,567
Defined benefit pension plan cost	791	1,244	2,200	2,642
Other	(116)	1,903	2,081	2,198
Segment Adjusted EBITDA	\$ 127,785	\$ 120,945	\$ 367,319	\$ 246,222

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

18. Restructuring and Other Related Costs:

The following table presents the components of restructuring and other related costs for the three and nine months ended September 30, 2017 and 2016:

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Severance and other employee costs related to legacy Eco restructuring plan	\$ —	\$ —	\$ 830	\$ 4,496
Severance and other employee costs related to performance materials plant closure	3,868	—	3,868	—
Other related costs	238	1,336	880	6,402
	<u>\$ 4,106</u>	<u>\$ 1,336</u>	<u>\$ 5,578</u>	<u>\$ 10,898</u>

Legacy Eco Restructuring Plan

On July 30, 2014, Eco Services, a newly formed Delaware limited liability company and indirect subsidiary of certain investment funds affiliated with CCMP, entered into an Asset Purchase Agreement with Solvay USA, Inc. (“Solvay”), a Delaware corporation, which provided for the sale, transfer and assignment by Solvay and the acquisition, acceptance and assumption by Eco Services, of substantially all of the assets of Solvay’s Eco Services business unit of Solvay’s regeneration and virgin sulfuric acid production business operations in the United States (the “2014 Acquisition”). Prior to the Asset Purchase Agreement with Solvay, Eco Services operated as a business unit within Solvay, which is an indirect, wholly owned subsidiary of Solvay SA.

Subsequent to the 2014 Acquisition, the Company initiated a restructuring plan designed to improve organizational efficiency and streamline the operations of Eco Services as a stand-alone company. The primary impact of the plan to the Company’s consolidated results of operations was the recognition of severance costs related to a reduction-in-force. These costs included benefits payable under ongoing Company severance plan arrangements, whereby payments are attributable to employee services rendered with benefits that accumulate over time. The liabilities and associated charges related to these severance costs are recognized by the Company when payment of the benefits becomes probable and estimable. Charges related to severance costs for the restructuring plan were \$830 and \$4,496 for the nine months ended September 30, 2017 and 2016, respectively. No severance costs were incurred related to this plan for the three months ended September 31, 2017 and 2016.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

Performance Materials Plant Closure

In September 2017, the Company approved and announced a plan to consolidate its manufacturing operations in Europe for the performance materials product group and close its facility in Kirchheimbolanden, Germany. The plan is part of the Company's overall strategy with respect to the Sovitec acquisition (see Note 5 to these condensed consolidated financial statements) and the realization of cost and other synergies related to the business combination. The facility will remain in operation over the short term in a reduced capacity, and the Company plans to cease operations at the location on or about March 31, 2018. The Company plans to relocate the manufacturing equipment to other European facilities, and is exploring strategic alternatives for the building and land. As a result, the Company classified the plant under the "held and used" accounting model as of September 30, 2017, as it did not meet the criteria to be classified as "held for sale."

As a result of the decision and announcement regarding the plant, the Company performed an impairment assessment related to the fixed assets of the facility. In conducting the recoverability assessment, the Company compared the carrying value of the asset group that includes the plant to the undiscounted future cash flows of the asset group, noting that there was no indication of impairment. The Company does not anticipate the acceleration of depreciation on the fixed assets associated with the plant, as the Company continues to utilize the assets and ultimately expects to relocate the equipment.

In addition to the fixed asset recoverability evaluation, the Company recorded a severance charge related to the pending closure and other cost reductions for its performance materials product group in Europe of \$3,868 for the three months ended September 30, 2017. The charge was fully recognized as of September 30, 2017 based on the types of benefits provided and the criteria for restructuring and exit cost recognition.

Although the Company does not expect to incur additional severance costs related to the closure, the Company will incur additional costs related to the dismantling, transportation and reassembly of the manufacturing equipment after the plant ceases operations, which is currently estimated to be between \$500 and \$1,000.

Rollforward of Restructuring Liabilities

The activity in the accrued liability balance associated with the Company's restructuring plans, all of which related to severance and other employee costs, was as follows for the nine months ended September 30, 2017:

	Legacy Eco Restructuring Plan	Performance Materials Plant Closure	Total Restructuring Charges
Balance at December 31, 2016	\$ 1,643	\$ —	\$ 1,643
Restructuring charges	830	3,868	4,698
Cash payments	(1,971)	—	(1,971)
Balance at September 30, 2017	<u>\$ 502</u>	<u>\$ 3,868</u>	<u>\$ 4,370</u>

The remaining accrued liability balance associated with the restructuring plans at September 30, 2017 is expected to be paid in 2018.

Other Related Costs

The Company incurred severance and other business optimization costs of \$238 and \$1,336 for the three months ended September 30, 2017 and 2016, respectively, and \$880 and \$6,402 for the nine months ended September 30, 2017 and 2016, respectively. These costs were not associated with formal restructuring plans and primarily related to severance charges for certain executives, transition/duplicate staffing, professional fees and other expenses related to the Company's organizational changes.

19. Earnings per Share:

Basic earnings per share is calculated as income (loss) available to common stockholders, divided by the weighted average number of common shares outstanding during the period for each class of common stock, respectively. Diluted earnings per share is calculated as income (loss) available to common stockholders, divided by the weighted average number of common and potential common shares outstanding during the period for each class of common stock, if dilutive.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands, except share and per share amounts)
(unaudited)

The reconciliation from basic to diluted weighted average shares outstanding is as follows:

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Weighted average common shares outstanding – Basic	104,096,837	103,783,719	104,020,180	81,986,221
Dilutive effect of unvested common shares with service conditions and assumed stock option exercises and conversions	—	—	—	—
Weighted average common shares outstanding – Diluted	<u>104,096,837</u>	<u>103,783,719</u>	<u>104,020,180</u>	<u>81,986,221</u>

The following table reconciles the components of basic and diluted loss per share for the three and nine months ended September 30, 2017 and 2016:

	Three months ended September 30,		Nine months ended September 30,	
	2017	2016	2017	2016
Numerator:				
Net loss attributable to PQ Group Holdings Inc.	\$ (3,345)	\$ (10,017)	\$ (7,408)	\$ (90,410)
Denominator:				
Weighted average common shares outstanding – Basic	104,096,837	103,783,719	104,020,180	81,986,221
Weighted average common shares outstanding – Diluted	104,096,837	103,783,719	104,020,180	81,986,221
Net loss per common share:				
Basic earnings per share	\$ (0.03)	\$ (0.10)	\$ (0.07)	\$ (1.10)
Diluted earnings per share	<u>\$ (0.03)</u>	<u>\$ (0.10)</u>	<u>\$ (0.07)</u>	<u>\$ (1.10)</u>

20. Subsequent Events:

On September 29, 2017, the Company’s common stock began trading on the New York Stock Exchange under the symbol “PQG”. On October 3, 2017, the Company completed the IPO of its common stock at a price to the public of \$17.50 per share. The Company issued and sold 29,000,000 shares of common stock in the IPO. The Company raised net proceeds of approximately \$480,525 from the IPO, after deducting underwriting discounts, commissions and related offering expenses, net of reimbursements. The Company used the net proceeds of the IPO to repay debt together with accrued and unpaid interest and applicable redemption premiums (see Note 12 to these condensed consolidated financial statements for further information).

In connection with the reclassification, stock split and conversion transactions associated with the IPO related to the Company’s Class A and Class B common stock (see Note 1 to these condensed consolidated financial statements for further information), the Company’s outstanding restricted stock and stock option awards were converted on the same basis, including equivalent adjustments to the respective exercise prices with respect to the stock option awards. The vesting and other terms of the restricted stock and stock option awards were otherwise unchanged. In connection with the IPO, the Company’s board of directors adopted the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan (the “2017 Plan”), with all future equity awards of the Company to be issued under the 2017 Plan. On October 2, 2017, the Company granted the following equity awards related to its common stock to certain of its officers, employees and directors in connection with the IPO: 1,654,685 restricted stock units; 621,747 stock options; and 21,067 stock awards. The restricted stock units and stock options are subject to service vesting conditions, while the stock awards were immediately vested upon grant.

The Company has evaluated subsequent events since the balance sheet date and determined that, other than the items noted above, there are no additional items to disclose.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.

Forward-looking Statements

This periodic report on Form 10-Q ("Form 10-Q") includes statements that express our opinions, expectations, beliefs, plans, objectives, assumptions or projections regarding future events or future results and therefore are, or may be deemed to be, "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995 (the "Act"). The following cautionary statements are being made pursuant to the provisions of the Act and with the intention of obtaining the benefits of the "safe harbor" provisions of the Act. The words "believe," "may," "will," "estimate," "continue," "anticipate," "intend," "expect," "should" and similar expressions are intended to identify forward-looking statements. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy, short- and long-term business operations and objections, and financial needs. Examples of forward-looking statements include, but are not limited to, statements we make regarding our liquidity, including our belief that our current level of operations, cash and cash equivalents, cash flow from operations and borrowings under our credit facilities and other lines of credit will provide us adequate cash to fund the working capital, capital expenditure, debt service and other requirements for our business for the foreseeable future. These forward-looking statements are subject to a number of risks, uncertainties and assumptions. Moreover, we operate in a very competitive and rapidly changing environment and new risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed herein may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. Some of the key factors that could cause actual results to differ from our expectations include risks related to:

- our exposure to local business risks and regulations in different countries;
- general economic conditions;
- exchange rate fluctuations;
- legal and regulatory compliance;
- technological or other changes in our customers' products;
- our and our competitors' research and development;
- fluctuations in prices of raw materials and relationships with our key suppliers;
- substantial competition;
- non-payment or non-performance by our customers;
- reliance on a small number of customers;
- potential early termination or non-renewal of customer contracts in our refining services product group;
- reductions in highway safety spending;
- seasonal fluctuations in demand for some of our products;
- retention of certain key personnel;
- our expansion projects;
- potential product liability claims;
- existing and potential future government regulation;
- the extensive environmental, health and safety regulations to which we are subject;
- disruption of production and distribution of our products;
- our insurance coverage;

[Table of Contents](#)

- product quality;
- our acquisition strategy;
- our joint venture investments;
- our failure to protect our intellectual property and infringement on the intellectual property rights of third parties;
- information technology risks;
- potential labor disruptions;
- litigation and other administrative and regulatory proceedings; and
- our substantial indebtedness.

The forward-looking statements included herein are made only as of the date hereof. You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this Form 10-Q to conform these statements to actual results or to changes in our expectations.

Overview

We are a leading global provider of catalysts, specialty materials and chemicals, and services that enable environmental improvements, enhance consumer products and increase personal safety. Our products and solutions help companies produce vehicles with improved fuel efficiency and cleaner emissions. Our materials are critical ingredients in consumer products that make teeth brighter, skin softer and wounds heal faster. We produce highly engineered materials that make highways and airports safer for drivers and pilots. Because our products are predominantly inorganic and carbon-free, we believe we contribute to improving the sustainability of our planet.

We conduct operations through two reporting segments: environmental catalysts and services and performance materials and chemicals. Our environmental catalysts and services business is a leading global innovator and producer of catalysts for the refinery, emissions control and petrochemical industries and is also a leading provider of catalyst recycling services to the North American refining industry. We believe our products are mission critical for our customers in these growing applications and impart essential functionality in chemical and refining production processes and in emissions control for engines. Our environmental catalysts and services business consists of three product groups: silica catalysts, zeolite catalysts and refining services. Our performance materials and chemicals business is a silicates and specialty materials producer with leading supply positions for the majority of our products sold in North America, Europe, South America, Australia and Asia (excluding China) serving diverse and growing end uses such as personal and industrial cleaning products, fuel efficient tires (“green tires”), surface coatings and food and beverage. Our products are essential additives, ingredients, and precursors that are critical to the performance characteristics of our customers’ products, yet typically represent only a small portion of our customers’ overall end-product costs. Our performance materials and chemicals business consists of two product groups: performance chemicals and performance materials. In 2016, we served over 4,000 customers globally across many end uses and, as of September 30, 2017, operated out of 72 manufacturing facilities, which are strategically located across six continents.

Company Background and Business Combination

On December 1, 2014, Eco Services Operations LLC (“Eco”), a Delaware limited liability company and an indirect subsidiary of investment funds affiliated with CCMP Capital Advisors, LLC (now known as CCMP Capital Advisors, LP; “CCMP”), acquired substantially all of the assets of Solvay’s Eco Services business unit (the “2014 Acquisition”).

On August 17, 2015, PQ Group Holdings Inc. (“PQ Group Holdings,” “the company,” “we,” “us,” or “our”), PQ Holdings Inc. (“PQ Holdings”), PQ Corporation, Eco, Eco Services Intermediate Holdings LLC, Eco Services Group Holdings LLC, investment funds affiliated with CCMP, and certain other stockholders of PQ Holdings and Eco entered into a reorganization and transaction agreement pursuant to which the companies consummated a series of transactions (the “Business Combination”) to reorganize and combine the businesses of PQ Holdings and Eco under a new holding company, PQ Group Holdings. The Business Combination was consummated on May 4, 2016. We refer to the business of PQ Holdings prior to the Business Combination as “legacy PQ” and the business of Eco prior to the Business Combination as “legacy Eco.”

In accordance with GAAP, legacy Eco was the accounting acquirer in the Business Combination and, as such, legacy Eco is treated as our predecessor. Investment funds affiliated with CCMP held a controlling interest in legacy Eco and a non-controlling interest in legacy PQ prior to the Business Combination.

The following table summarizes, for each of the periods specified below and for which financial information is included for PQ Group Holdings in this Form 10-Q, the portion, if any, of the financial results of legacy PQ and legacy Eco that is included in the financial results for such periods presented in accordance with GAAP.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2017	2016	2017	2016
Operations of legacy Eco	Included	Included	Included	Included
Operations of legacy PQ	Included	Included	Included	Partially included (May 4 to September 30)

Key Performance Indicators

Adjusted EBITDA and Adjusted Net Income

Adjusted EBITDA and adjusted net income are non-GAAP financial measures that we use to evaluate our operating performance, for business planning purposes and to measure our performance relative to that of our competitors. Adjusted EBITDA and adjusted net income are presented as key performance indicators as we believe these financial measures will enhance a prospective investor’s understanding of our results of operations and financial condition. EBITDA consists of net income (loss) attributable to PQ Group Holdings before interest, taxes, depreciation and amortization. Adjusted EBITDA consists of EBITDA adjusted for (i) non-operating income or expense, (ii) the impact of certain non-cash, nonrecurring or other items included in net income (loss) and EBITDA that we do not consider indicative of our ongoing operating performance, and (iii) depreciation, amortization and interest of our 50% share of the Zeolyst Joint Venture. Adjusted net income consists of net income (loss) attributable to PQ Group Holdings adjusted for (i) non-operating income or expense and (ii) the impact of certain non-cash, nonrecurring or other items included in net income (loss) that we do not consider indicative of our ongoing operating performance. We believe that these non-GAAP financial measures provide investors with useful financial metrics to assess our operating performance from period-to-period by excluding certain items that we believe are not representative of our core business.

You should not consider adjusted EBITDA and adjusted net income in isolation or as alternatives to the presentation of our financial results in accordance with GAAP. The presentation of our adjusted EBITDA and adjusted net income financial measures may differ from similar measures reported by other companies and may not be comparable to other similarly titled measures. In evaluating adjusted EBITDA and adjusted net income, you should be aware that we are likely to incur expenses similar to those eliminated in this presentation in the future and that certain of these items could be considered recurring in nature. Our presentation of adjusted EBITDA and adjusted net income should not be construed as an inference that our future results will be unaffected by unusual or nonrecurring items. Reconciliations of adjusted EBITDA and adjusted net income to GAAP net income (loss) are included in the results of operations discussion that follows for each of the respective periods.

Key Factors and Trends Affecting Operating Results and Financial Condition

Sales

Our environmental catalysts and services business consists of three product groups: silica catalysts, zeolite catalysts, and refining services. Our environmental catalysts and services sales have grown primarily due to expansion into new end applications, including emission control catalysts, polymer catalysts, and refining catalysts, as well as continued supply share gains. Sales in our environmental catalysts and services segment are made on both a purchase order basis and pursuant to long-term contracts.

Our performance materials and chemicals business consists of two product groups: performance chemicals and performance materials. Expansions into new applications, including personal care and consumer cleaning, as well as share gains in existing end uses, have added to the growth of our sales. Historically, our performance materials and chemicals business has experienced relatively stable demand both seasonally and throughout economic cycles, due to the diverse consumer and industrial end uses that our products serve. Product sales from our performance chemicals product group are made on both a purchase order basis and pursuant to long-term contracts. In the performance materials product group, sales have been driven by the growth of spending on repair, maintenance and upgrade of existing highways and the construction of new highways and roads by governments around the world. Product sales in our performance materials product group are made principally on a purchase order basis. There may be modest fluctuations in timing of orders, but orders are mainly driven by demand and general economic conditions.

Cost of Goods Sold

Cost of goods sold consists of variable product costs, fixed manufacturing expenses, depreciation expense and freight expenses. Variable product costs include all raw materials, energy and packaging costs that are directly related to the manufacturing process. Fixed manufacturing expenses include all plant employment costs, manufacturing overhead and periodic maintenance costs. The primary raw materials used in the manufacture of products in our performance materials and chemicals business include soda ash, industrial sand, aluminum trihydrate, sodium hydroxide, and cullet. For the year ended December 31, 2016 approximately 45% of sales with our largest sodium silicate customers in North America were made under contracts that include price adjustments for changes in the price of raw materials and natural gas. Under these contracts, there generally is a time lag of three to nine months for price changes to pass through, depending on the magnitude of the change in cost and other market dynamics. The primary raw materials for our environmental catalysts and services business include spent sulfuric acid, sulfur, sodium silicates, acids, bases, and certain metals. Most of our refining services contracts feature take-or-pay volume protection and/or quarterly price adjustments for commodity inputs, labor, the Chemical Engineering Index (U.S. chemical plant construction cost index) and natural gas. Over 94% of our refining services product group pro forma sales for the years ended December 31, 2016 were under contracts featuring quarterly price adjustments. The price adjustments generally reflect actual costs for producing acid and tend to protect us from volatility in labor, fixed costs and raw material pricing. Freight expenses are generally passed through directly to customers. Spent acid for our refining services product group is supplied by customers for a nominal charge as part of their contracts. While natural gas is not a direct feedstock for any product, all businesses use natural gas powered furnaces to heat raw materials and create the chemical reactions necessary to produce end-products. We maintain multiple suppliers wherever possible, hedge exposure to fluctuations in prices for natural gas purchases in the United States, make forward purchases of natural gas in the United States, Canada, and Europe to mitigate our exposure to price volatility, and structure our customer contracts when possible to allow for the pass-through of raw material and natural gas costs.

Joint Ventures

We account for our investments in our equity joint ventures under the equity method. Our largest joint venture, the Zeolyst Joint Venture, manufactures high performance specialty zeolite-based catalysts for use in the emissions control industry, the petrochemical industry and other areas of the broader chemicals industry. We share proportionally in the management of our joint ventures with the other parties to each such joint venture.

Industry

We compete in the specialty chemicals and materials industry. Our industry is characterized by constant development of new products and the need to support customers with new product innovation and technical services to meet their challenges. In addition, products must maintain consistent quality and be a reliable source of supply in order to meet the needs of customers. In addition, many products in the specialty chemicals and materials industry benefit from economics that favor incumbent producers because the capital cost to expand existing capacity is typically significantly less than the capital cost necessary to build a new plant. Our industry is also characterized by the need to produce consistent quality in a safe and environmentally sustainable manner.

Seasonality

We experience some seasonality, primarily with respect to the performance materials and refining services product groups. With respect to the performance materials product group, sales and earnings are generally higher during the second and third quarters of the year as highway striping projects typically occur during warmer weather months. Additionally, the refining services product group typically experiences similar seasonal fluctuations as a result of higher demand for gasoline products in the summer months. As a result, working capital requirements tend to be higher in the first and fourth quarters of the year, while higher cash generation occurs in the second and third quarters of the year.

Inflation

Inflationary pressures may have an adverse effect on us, impacting raw material costs and other operating costs, as well as resulting in higher fixed asset replacement costs. We attempt to manage these impacts with cost control, productivity improvements and contractual arrangements, as well as price increases to customers.

Foreign Currency

As a global business, we are subject to the impact of gains and losses on currency translations, which occur when the financial statements of foreign operations are translated into U.S. dollars. We operate a geographically diverse business with approximately 40% and 34% of our sales for the nine months ended September 30, 2017 and the year ended December 31, 2016, respectively, in currencies other than the U.S. dollar. Because our consolidated financial results are reported in U.S. dollars, sales or earnings generated in currencies other than the U.S. dollar can result in a significant increase or decrease in the amount of those sales and earnings when translated to U.S. dollars. The foreign currencies to which we have the most significant exchange rate exposure include the Euro, British pound, Canadian dollar, Brazilian real and the Mexican peso.

Recent Developments

On August 28, 2017, in anticipation of the arrival of Hurricane Harvey, we shut down our Houston and Baytown refining services facilities in coordination with our refinery partners. We restarted our Houston facility on September 3, 2017 and our Baytown facility on September 24, 2017 and both have returned to normal operation. We believe that the operational interruption at these facilities negatively impacted our sales for the three and nine months ending September 30, 2017 by \$5.6 million and our Adjusted EBITDA for the same periods by \$4.7 million. We maintain business interruption insurance coverage and we expect to submit claims under such policy. However, there is no assurance that such impacts will be offset in whole or in part by recoveries under any such insurance claims in a timely manner or at all. We do not expect that these operational interruptions will have a material adverse affect on our business, financial condition or results of operations.

Pro Forma Results of Operations

In addition to the analysis of historical results of operations, we have prepared unaudited supplemental pro forma results of operations for the nine months ended September 30, 2016. The unaudited pro forma statements of operations reflect pro forma adjustments to the results of PQ Group Holdings to give effect to the Business Combination and the related financing transactions as if they had occurred on January 1, 2015. The unaudited pro forma adjustments include:

- elimination of intercompany sales between legacy PQ and legacy Eco;
- adjustments to depreciation expense related to the step-up in fair value of property, plant and equipment;
- adjustments to amortization expense related to the step-up in fair value of definite-lived intangible assets;
- removal of non-recurring adjustments related to the step-up in the fair value of inventory;
- adjustments to stock compensation expense to reflect charges as they relate to our new capital structure;
- adjustments related to the amortization of the step-up in fair value of property, plant, equipment and definite-lived intangible assets related to our Zeolyst Joint Venture;
- adjustments to interest expense related to the senior secured term loan facility;
- adjustments related to the write-off of existing deferred financing fees, original issue discounts and prepayment penalties; and
- the tax effect of the aforementioned adjustments, including the effect related to the change in tax status of Eco from a limited liability company to a C-corporation.

The unaudited pro forma statements of operations have been prepared in accordance with Article 11 of Regulation S-X by combining the historical results of operations of legacy Eco and legacy PQ for the periods prior to May 4, 2016 and should be read in conjunction with our historical consolidated financial statements and related notes thereto included elsewhere in this Form 10-Q.

The unaudited pro forma statements of operations have been prepared for illustrative purposes only and are not necessarily indicative of the combined results of operations that would have been realized had the pro forma transactions been completed as of the dates indicated, nor are they meant to be indicative of any anticipated future results of operations. The unaudited pro forma adjustments are based upon available information and assumptions we believe are factually supportable, directly attributable to the Business Combination and the related financing transactions, and with respect to the statement of operations, expected to have a continuing impact on our business, and that we believe are reasonable under the circumstances. In addition, the unaudited pro forma statements of operations do not include any pro forma adjustments to reflect expected cost savings or restructuring actions which may be achievable or the impact of any non-recurring activity and transaction-related costs.

We believe that the unaudited pro forma statements of operations are a useful presentation of our results of operations as they provide comparative information, period-over-period, on a more comparable basis.

Results of Operations

Three Months Ended September 30, 2017 Compared to the Three Months Ended September 30, 2016

Highlights

The following is a summary of our financial performance for the three months ended September 30, 2017 compared with the three months ended September 30, 2016.

Sales

- Net sales increased \$21.8 million to \$391.8 million. The increase in sales was primarily due to organic growth driven by favorable price and mix, and the contribution of \$13.5 million of sales related to our recent Sovitec acquisition, which was completed on June 12, 2017. These factors more than offset the negative impact on sales volumes from Hurricane Harvey, which caused a temporary shutdown of two refining services plants in southeast Texas.

Gross Profit

- Gross profit increased \$7.2 million to \$102.5 million. Our increase in gross profit was primarily due to organic growth driven by favorable price and mix, as well as the gross profit contributed by the Sovitec acquisition for the three months ended September 30, 2017.

Operating Income

- Operating income increased by \$2.2 million to \$46.5 million. Our operating income increased due to the Sovitec acquisition and the margins generated by the increase in customer pricing for the three months ended September 30, 2017.

Equity in Net Income of Affiliated Companies

- Equity in net income of affiliated companies for the three months ended September 30, 2017 was \$10.3 million, compared with a \$4.6 million loss for the three months ended September 30, 2016. The increase was due to \$4.2 million of earnings generated by our Zeolyst Joint Venture and \$10.4 million of lower amortization of investment in affiliate inventory step-up costs incurred for the three months ended September 30, 2017.

The following is our condensed consolidated statement of operations and a summary of financial results for the three months ended September 30, 2017 and 2016:

	Three months ended September 30,		Change	
	2017	2016	\$	%
	Unaudited	Unaudited		
	(in millions, except percentages)			
Sales	\$ 391.8	\$ 370.0	\$ 21.8	5.9 %
Cost of goods sold	289.3	274.7	14.6	5.3 %
Gross profit	102.5	95.3	7.2	7.6 %
<i>Gross profit margin</i>	26.2%	25.8%		
Selling, general and administrative expenses	36.2	36.0	0.2	0.6 %
Other operating expense, net	19.8	15.0	4.8	32.0 %
Operating income	46.5	44.3	2.2	5.0 %
<i>Operating income margin</i>	11.9%	12.0%		
Equity in net (income) loss of affiliated companies	(10.3)	4.6	(14.9)	(323.9)%
Interest expense, net	49.1	48.6	0.5	1.0 %
Debt extinguishment costs	0.5	—	0.5	— %
Other expense, net	5.1	4.2	0.9	21.4 %
Income (loss) before income taxes and noncontrolling interest	2.1	(13.1)	15.2	(116.0)%
Provision for (benefit) income taxes	5.2	(3.5)	8.7	(248.6)%
<i>Effective tax rate</i>	239.9%	26.9%		
Net loss	(3.1)	(9.6)	6.5	(67.7)%
Less: Net income attributable to the noncontrolling interest	0.3	0.4	(0.1)	(25.0)%
Net loss attributable to PQ Group Holdings Inc.	\$ (3.4)	\$ (10.0)	\$ 6.6	(66.0)%

Sales

	Three months ended September 30,		Historical		Change	
	2017	2016	\$		\$	%
	(in millions, except percentages)					
Net Sales:						
Performance Chemicals	\$ 175.5	\$ 167.8	\$ 7.7		\$ 7.7	4.6 %
Performance Materials	104.4	90.2	14.2		14.2	15.7 %
Eliminations	(2.8)	(1.9)	(0.9)		(0.9)	47.4 %
Performance Materials & Chemicals	\$ 277.1	\$ 256.1	\$ 21.0		\$ 21.0	8.2 %
Silica Catalyst	\$ 15.1	\$ 21.0	\$ (5.9)		\$ (5.9)	(28.1)%
Refining Services	100.4	93.3	7.1		7.1	7.6 %
Environmental Catalysts & Services	115.5	114.3	1.2		1.2	1.1 %
Inter-segment sales eliminations	(0.8)	(0.4)	(0.4)		(0.4)	100.0 %
Total net sales	\$ 391.8	\$ 370.0	\$ 21.8		\$ 21.8	5.9 %

Performance Materials & Chemicals: Sales in performance materials and chemicals for the three months ended September 30, 2017 were \$277.1 million, an increase of \$21.0 million, or 8.2%, compared to sales of \$256.1 million for the three months ended September 30, 2016. The increase in sales was primarily due to \$13.5 million related to the Sovitec acquisition, favorable effects of foreign currency exchange of \$4.5 million, higher average selling price and favorable customer mix of \$2.6 million and slightly higher volumes.

The higher average selling price was principally a result of customer mix, favorable U.S. dollar denominated sales and U.S. dollar cost pass through pricing in certain foreign locations. The favorable effects of foreign currency were primarily driven by the stronger Euro compared to the U.S. dollar.

Environmental Catalysts & Services: Sales in environmental catalysts and services for the three months ended September 30, 2017 were \$115.5 million, an increase of \$1.2 million, or 1.1%, compared to sales of \$114.3 million for the three months ended September 30, 2016. The increase in sales was primarily due to higher average selling price and customer mix of \$6.1 million, which was partially offset by lower volumes of \$4.9 million.

The higher average selling price and customer mix was driven by the higher realization from sulfuric acid regeneration contract renewals partly offset by unfavorable virgin sulfuric acid pricing due to the mix of customers. The decrease in volumes was driven by lower chemical catalysts sales due to record methyl methacrylate sales volumes in the prior year and the negative impact of Hurricane Harvey on sulfuric acid regeneration sales, which was partially offset by stronger virgin sulfuric acid sales volumes due to the timing of customer plant turnarounds.

Gross Profit

Gross profit for the three months ended September 30, 2017 was \$102.5 million, an increase of \$7.2 million, or 7.6%, compared with \$95.3 million for the three months ended September 30, 2016. The increase in gross profit was due to higher average selling price of \$8.7 million and \$4.5 million in gross profit contributed from the Sovitec acquisition, which was partially offset by higher depreciation expense of \$3.0 million, unfavorable product mix of \$2.2 million and lower volumes of \$1.7 million.

The higher average selling price and customer mix was driven by the higher realization from sulfuric acid regeneration contract renewals partly offset by unfavorable virgin sulfuric acid pricing due to the mix of customers. This was partly offset by unfavorable product mix and volumes due to higher methyl methacrylate sales in the prior year as well as the negative impact of Hurricane Harvey.

Selling, General and Administrative Expenses

Selling, general and administrative expenses for the three months ended September 30, 2017 were \$36.2 million, a slight increase of \$0.2 million compared with \$36.0 million for the three months ended September 30, 2016.

Other Operating Expense, Net

Other operating expense, net for the three months ended September 30, 2017 was \$19.8 million, an increase of \$4.8 million, compared with \$15.0 million for the three months ended September 30, 2016. The increase in other operating expense, net was due to increased losses on the sale of assets and restructuring and plant closure costs, offset by lower severance and transaction costs related to the Business Combination.

Equity in Net Income of Affiliated Companies

Equity in net income of affiliated companies for the three months ended September 30, 2017 was \$10.3 million, compared with a loss of \$4.6 million for the three months ended September 30, 2016. The increase was primarily due to an increase of \$4.2 million of earnings generated by our Zeolyst Joint Venture during the three months ended September 30, 2017 and \$10.4 million of lower amortization on the fair value step-up of inventory and other underlying assets of our Zeolyst Joint Venture. The increase in earnings generated by our Zeolyst Joint Venture was due to higher specialty catalyst sales of aromatic and dewaxing catalysts and an increase in hydrocracking volumes to the oil refining industry.

Interest Expense, Net

Interest expense, net for the three months ended September 30, 2017 was \$49.1 million, an increase of \$0.5 million, as compared with \$48.6 million for the three months ended September 30, 2016.

Debt Extinguishment Costs

Debt extinguishment costs for the three months ended September 30, 2017 were \$0.5 million. On August 7, 2017, we re-priced the existing U.S. dollar-denominated tranche and existing Euro-denominated tranche of our term loans to reduce the applicable interest rates. The company recorded \$0.2 million of new creditor and third-party financing fees as debt extinguishment costs. In addition, previous unamortized deferred financing costs of \$0.1 million and original issue discount of \$0.2 million associated with the old debt were written off as debt extinguishment costs.

Other Expense, Net

Other expense, net for the three months ended September 30, 2017 was \$5.1 million, an increase of \$0.9 million, as compared with \$4.2 million for the three months ended September 30, 2016. The change in other expense, net primarily consisted of an increase of \$1.8 million of foreign currency losses, which was partially offset by \$0.9 million in lower professional fees.

Provision (Benefit) for Income Taxes

The provision for income taxes for the three months ended September 30, 2017 was \$5.2 million compared to a \$3.5 million benefit for the three months ended September 30, 2016. The effective income tax rate for the three months ended September 30, 2017 was 239.9% compared to 26.9% for the three months ended September 30, 2016.

The difference between the U.S. federal statutory income tax rate and our effective income tax rate for the three months ended September 30, 2017 and 2016 was mainly due to the tax effect of our foreign currency exchange loss recognized as a discrete item for the purposes of calculating the effective tax rate as well as the tax effect of repatriating foreign earnings back to the U.S. as dividends, partially offset by lower tax rates in foreign jurisdictions as compared to the U.S. federal tax rate, state taxes and foreign withholding taxes.

Net Loss Attributable to PQ Group Holdings

For the foregoing reasons and after the effect of the non-controlling interest in earnings of subsidiaries for each period presented, net loss attributable to PQ Group Holdings was \$3.4 million for the three months ended September 30, 2017 compared with a net loss of \$10.0 million for three months ended September 30, 2016.

Adjusted EBITDA

Summarized Segment Adjusted EBITDA information is shown below in the following table:

	Three months ended September 30,		Change	
	2017	2016	\$	%
Segment Adjusted EBITDA ⁽¹⁾ :				
Performance Materials & Chemicals	\$ 65.9	\$ 64.6	\$ 1.3	2.0%
Environmental Catalysts & Services ⁽²⁾	61.9	56.4	5.5	9.8%
Total Segment Adjusted EBITDA ⁽³⁾	127.8	121.0	6.8	5.6%
Unallocated corporate costs	(7.9)	(7.4)	(0.5)	6.8%
Total Adjusted EBITDA ⁽³⁾	\$ 119.9	\$ 113.6	\$ 6.3	5.5%

- (1) We define Segment Adjusted EBITDA as EBITDA adjusted for certain items as noted in the reconciliation below. Our management evaluates the performance of our segments and allocates resources based primarily on Segment Adjusted EBITDA. Segment Adjusted EBITDA does not represent cash flow for periods presented and should not be considered as an alternative to net income as an indicator of our operating performance or as an alternative to cash flows as a source of liquidity. Segment Adjusted EBITDA may not be comparable with EBITDA or Adjusted EBITDA as defined by other companies.
- (2) The Adjusted EBITDA from our Zeolyst Joint Venture included in the environmental catalyst and services segment is \$14.4 million for the three months ended September 30, 2017, which includes \$10.2 million of equity in net income plus \$1.7 million of amortization of investment in affiliate step-up plus \$2.6 million of joint venture depreciation, amortization and interest. The Adjusted EBITDA from our Zeolyst Joint Venture included in the environmental catalyst and services segment is \$10.3 million for the three months ended September 30, 2016, which includes \$4.7 million of equity in net loss plus \$12.3 million of amortization of investment in affiliate step-up plus \$2.7 million of joint venture depreciation, amortization and interest.
- (3) Our total Segment Adjusted EBITDA differs from our total consolidated Adjusted EBITDA due to unallocated corporate expenses.

Adjusted EBITDA for the three months ended September 30, 2017 was \$119.9 million, an increase of \$6.3 million, or 5.5%, compared with \$113.6 million for the three months ended September 30, 2016.

Performance Materials & Chemicals: Adjusted EBITDA for the three months ended September 30, 2017 was \$65.9 million, an increase of \$1.3 million, or 2.0%, compared with \$64.6 million for the three months ended September 30, 2016.

The increase in Adjusted EBITDA was due to earnings contributed by the Sovitec acquisition of \$2.0 million partially offset by higher manufacturing costs to support the start-up of the ThermoDrop® production facility and higher non-pass through raw materials costs.

Environmental Catalysts & Services: Adjusted EBITDA for the three months ended September 30, 2017 was \$61.9 million, an increase of \$5.5 million, or 9.8%, compared with \$56.4 million for the three months ended September 30, 2016.

The increase in Adjusted EBITDA was driven primarily by the higher realization from sulfuric acid regeneration contract renewals and higher Zeolyst Joint Venture volumes driven by specialty catalyst sales of aromatic and dewaxing catalysts as well as hydrocracking sales to the oil markets. This was partly offset by the timing of plant turnaround costs and costs incurred due to Hurricane Harvey.

A reconciliation of Segment Adjusted EBITDA to net loss attributable to PQ Group Holdings is as follows:

	Three months ended September 30,	
	2017	2016
Reconciliation of net loss attributable to PQ Group Holdings Inc. to Segment Adjusted EBITDA		
Net loss attributable to PQ Group Holdings Inc.	\$ (3.4)	\$ (10.0)
Provision for (benefit from) income taxes	5.2	(3.5)
Interest expense, net	49.1	48.6
Depreciation and amortization	45.9	43.6
EBITDA	96.8	78.7
Joint venture depreciation, amortization and interest ^(a)	2.6	2.7
Amortization of investment in affiliate step-up ^(b)	1.7	12.3
Amortization of inventory step-up ^(c)	—	5.8
Debt extinguishment costs	0.5	—
Net loss on asset disposals ^(d)	3.5	0.6
Foreign currency exchange loss ^(e)	5.3	3.2
Non-cash revaluation of inventory, including LIFO	0.8	0.3
Management advisory fees ^(f)	1.3	1.3
Transaction related costs ^(g)	1.0	1.7
Equity-based and other non-cash compensation	1.0	1.1
Restructuring, integration and business optimization expenses ^(h)	5.0	2.8
Defined benefit plan pension cost ⁽ⁱ⁾	0.8	1.2
Other ⁽ⁱ⁾	(0.4)	1.9
Adjusted EBITDA	119.9	113.6
Unallocated corporate expenses	7.9	7.4
Total Segment Adjusted EBITDA	\$ 127.8	\$ 121.0

- (a) We use Adjusted EBITDA as a performance measure to evaluate our financial results. Because our environmental catalysts and services segment includes our 50% interest in our Zeolyst Joint Venture, we include an adjustment for our 50% proportionate share of depreciation, amortization and interest expense of our Zeolyst Joint Venture.
- (b) Represents the amortization of the fair value adjustments associated with the equity affiliate investment in our Zeolyst Joint Venture as a result of the Business Combination. We determined the fair value of the equity affiliate investment and the fair value step-up was then attributed to the underlying assets of our Zeolyst Joint Venture. Amortization is primarily related to the fair value adjustments associated with inventory, fixed assets and intangible assets, such as customer relationships, formulations and product technology.
- (c) As a result of the Business Combination, there was a step-up in the fair value of inventory at PQ Holdings, which is amortized through cost of goods sold in the income statement.
- (d) We do not have a history of significant asset disposals. However, when asset disposals occur, we remove the impact of net gain/loss of the disposed asset because such impact primarily reflects the non-cash write-off of long-lived assets no longer in use.
- (e) Reflects the exclusion of the negative or positive transaction gains and losses of foreign currency in the income statement primarily related to the Euro denominated term loan and the non-permanent intercompany debt denominated in local currency translated to U.S. dollars.
- (f) Reflects consulting fees paid to CCMP and affiliates of INEOS for consulting services that include certain financial advisory and management services. These payments ceased upon the closing of our initial public offering.
- (g) Relates to certain transaction costs described in our condensed consolidated financial statements for the quarter ended September 30, 2017 as well as other costs related to several transactions that are completed, pending or abandoned and that we believe are not representative of our ongoing business operations.
- (h) Includes the impact of restructuring, integration and business optimization expenses that are related to specific, one-time items, including severance for a reduction in force and post-merger integration costs that are not expected to recur.
- (i) Represents adjustments for defined benefit pension plan costs in our income statement. More than two-thirds of our defined benefit pension plan obligations are under defined benefit pension plans that are frozen and the remaining obligations primarily relate to plans operated in certain of our non-U.S. locations that, pursuant to jurisdictional requirements, cannot be frozen. As such, we do not view such expenses as core to our ongoing business operations.

- (i) Other costs consist of certain expenses that are not core to our ongoing business operations and are generally related to specific, one-time items, including environmental remediation-related costs associated with the legacy operations of our business prior to the Business Combination, capital and franchise taxes, non-cash asset retirement obligation accretion and the initial implementation of procedures to comply with Section 404 of the Sarbanes-Oxley Act.

Adjusted Net Income

Summarized adjusted net income information is shown below in the following table:

	Three months ended September 30,	
	2017	2016
Reconciliation of net loss attributable to PQ Group Holdings Inc. to Adjusted Net Income ^{(1) (2)}		
Net loss attributable to PQ Group Holdings Inc.	\$ (3.4)	\$ (10.0)
Amortization of investment in affiliate step-up ^(b)	1.0	7.5
Amortization of inventory step-up ^(c)	—	3.6
Debt extinguishment costs	0.3	—
Net loss on asset disposals ^(d)	2.1	0.4
Foreign currency exchange loss ^(e)	5.2	4.3
Non-cash revaluation of inventory, including LIFO	0.5	0.2
Management advisory fees ^(f)	0.8	0.8
Transaction related costs ^(g)	0.6	1.0
Equity-based and other non-cash compensation	0.7	0.7
Restructuring, integration and business optimization expenses ^(h)	2.9	1.8
Defined benefit plan pension cost ⁽ⁱ⁾	0.5	0.8
Other ⁽ⁱ⁾	—	1.2
Adjusted net income	<u>\$ 11.2</u>	<u>\$ 12.3</u>

- (1) We define adjusted net income as net loss attributable to PQ Group Holdings adjusted for non-operating income or expense and the impact of certain non-cash or other items that are included in net income that we do not consider indicative of our ongoing operating performance. Adjusted net income is presented as a key performance indicator as we believe it will enhance a prospective investor's understanding of our results of operations and financial condition. Adjusted net income may not be comparable with net income or adjusted net income as defined by other companies.

- (2) Refer to the Adjusted EBITDA notes above for more information with respect to each adjustment.

The adjustments to net loss attributable to PQ Group Holdings Inc. are shown net of applicable tax rates which range between 34.6% and 42.1% for the three months ended September 30, 2017 and September 30, 2016, except for the foreign currency exchange loss for which the tax is calculated as a discrete item using the applicable statutory income tax rates.

Results of Operations

Historical and Pro Forma—Nine Months Ended September 30, 2017 Compared to the Nine Months Ended September 30, 2016 (the Pro Forma Discussion Compares the Historical Nine Months Ended September 30, 2017 to the Pro Forma Nine Months Ended September 30, 2016)

Highlights

The following is a summary of our financial performance for the nine months ended September 30, 2017 compared with the nine months ended September 30, 2016.

Sales

- Historical:* Net sales increased \$372.6 million to \$1,114.0 million. The increase in sales was primarily due to the inclusion of \$818.2 million of legacy PQ sales in our results of operations for the nine months ended September 30, 2017 as compared to \$462.1 million of legacy PQ sales included in our results of operations for the period of May 4, 2016 through September 30, 2016.
- Pro Forma:* Net sales increased \$33.7 million to \$1,114.0 million. The increase in sales was primarily due to the inclusion of \$17.2 million of sales related to the Sovitec acquisition and higher average customer prices and mix for the nine months ended September 30, 2017.

Gross Profit

- *Historical:* Gross profit increased \$109.0 million to \$292.7 million. Our increase in gross profit was primarily due to the inclusion of \$196.1 million of legacy PQ gross profit in our results of operations for the nine months ended September 30, 2017 as compared to \$91.6 million of legacy PQ gross profit included in our results of operations for the period of May 4, 2016 through September 30, 2016.
- *Pro Forma:* Gross profit increased \$3.6 million to \$292.7 million. Our increase in gross profit was primarily due to higher pricing and the earnings contributed by the Sovitec acquisition, which was partially offset by increased depreciation and higher manufacturing costs for the nine months ended September 30, 2017.

Operating Income

- *Historical:* Operating income increased by \$70.5 million to \$139.6 million. Our increase in operating income was primarily due to the inclusion of \$61.2 million of legacy PQ operating income in our results of operations for the nine months ended September 30, 2017 as compared to the inclusion of \$19.9 million of legacy PQ operating income in our results of operations for the period of May 4, 2016 through September 30, 2016. The increase in operating income was also due to lower selling, general and administrative expenses due to cost reduction initiatives and lower other operating expense, net from lower restructuring and severance related charges.
- *Pro forma:* Operating income increased by \$17.9 million to \$139.6 million. Our operating income increased due to the Sovitec acquisition, the margins generated by customer pricing increases and the result of cost reduction measures for the nine months ended September 30, 2017.

Equity in Net Income of Affiliated Companies

- *Historical:* Equity in net income of affiliated companies for the nine months ended September 30, 2017 was \$24.9 million, compared with a loss of \$9.3 million for the nine months ended September 30, 2016. The increase was due to an increase in earnings of \$15.9 million generated by our Zeolyst Joint Venture during the nine months ended September 30, 2017 as compared to the nine months ended September 30, 2016 and \$17.7 million of lower amortization on the fair value step-up of the underlying assets of our Zeolyst Joint Venture.
- *Pro Forma:* Equity in net income of affiliated companies for the nine months ended September 30, 2017 was \$24.9 million, compared with income of \$8.9 million for the nine months ended September 30, 2016. The increase in earnings generated by our Zeolyst Joint Venture was due to higher sales in the emission control, dewaxing and aromatics end markets, partly offset by lower hydrocracking volumes to the oil refining industry.

The following is our condensed consolidated statement of operations and a summary of financial results, presented on a historical and pro forma basis, for the nine months ended September 30, 2017 and 2016. The historical results of operations include legacy Eco for all periods presented and legacy PQ for the nine months ended September 30, 2017 and the period of May 4, 2016 through September 30, 2016. The unaudited pro forma results of operations reflect pro forma adjustments to the results of PQ Group Holdings to give effect to the Business Combination and the related financing transactions as if they had occurred on January 1, 2015.

	Historical				Historical Pro Forma			
	Nine Months Ended		Change		Nine Months Ended		Change	
	September 30,				September 30,			
	2017	2016	\$	%	2017	2016	\$	%
(in millions, except percentages)								
Sales	\$ 1,114.0	\$ 741.4	\$ 372.6	50.3 %	\$ 1,114.0	\$ 1,080.3	\$ 33.7	3.1 %
Cost of goods sold	821.3	557.7	263.6	47.3 %	821.3	791.2	30.1	3.8 %
Gross profit	292.7	183.7	109.0	59.3 %	292.7	289.1	3.6	1.2 %
Gross profit margin	26.3 %	24.8 %			26.3 %	26.8 %		
Selling, general and administrative expenses	105.9	74.0	31.9	43.1 %	105.9	111.5	(5.6)	(5.0)%
Other operating expense, net	47.2	40.6	6.6	16.3 %	47.2	55.9	(8.7)	(15.6)%
Operating income	139.6	69.1	70.5	102.0 %	139.6	121.7	17.9	14.7 %
Operating income margin	12.5 %	9.3 %			12.5 %	11.3 %		
Equity in net (income) loss of affiliated companies	(24.9)	9.3	(34.2)	(367.7)%	(24.9)	(8.9)	(16.0)	179.8 %
Interest expense, net	144.0	94.4	49.6	52.5 %	144.0	142.6	1.4	1.0 %
Debt extinguishment costs	0.5	11.9	(11.4)	(95.8)%	0.5	—	0.5	— %
Other expense, net	21.7	7.2	14.5	201.4 %	21.7	1.7	20.0	1,176.5 %
Loss before income taxes and noncontrolling interest	(1.7)	(53.7)	52.0	(96.8)%	(1.7)	(13.7)	12.0	(87.6)%
Provision for income taxes	5.3	36.0	(30.7)	(85.3)%	5.3	42.3	(37.0)	(87.5)%
Effective tax rate	-304.2 %	-67.1 %			-304.2 %	-308.4 %		
Net loss	(7.0)	(89.7)	82.7	(92.2)%	(7.0)	(56.0)	49.0	(87.5)%
Less: Net income attributable to the noncontrolling interest	0.4	0.7	(0.3)	(42.9)%	0.4	1.4	(1.0)	(71.4)%
Net loss attributable to PQ Group Holdings Inc.	\$ (7.4)	\$ (90.4)	\$ 83.0	(91.8)%	\$ (7.4)	\$ (57.4)	\$ 50.0	(87.1)%

Sales

	Historical				Pro Forma			
	Nine Months Ended September 30,		Change		Nine Months Ended September 30,		Change	
	2017	2016	\$	%	2017	2016	\$	%
(in millions, except percentages)								
Net Sales:								
Performance Chemicals	\$ 515.5	\$ 278.9	\$ 236.6	84.8%	\$ 515.5	\$ 505.3	\$ 10.2	2.0 %
Performance Materials	257.7	154.1	103.6	67.2%	257.7	238.9	18.8	7.8 %
Eliminations	(7.3)	(3.1)	(4.2)	135.5%	(7.3)	(6.1)	(1.2)	21.0 %
Performance Materials & Chemicals	\$ 765.9	\$ 429.9	\$ 336.0	78.2%	\$ 765.9	\$ 738.1	\$ 27.8	3.7 %
Silica Catalyst	\$ 52.3	\$ 33.1	\$ 19.2	58.0%	\$ 52.3	\$ 64.3	\$ (12.0)	(18.7)%
Refining Services	298.5	279.3	19.2	6.9%	298.5	279.3	19.2	6.9 %
Environmental Catalysts & Services	350.8	312.4	38.4	12.3%	350.8	343.6	7.2	2.1 %
Inter-segment sales eliminations	(2.7)	(0.9)	(1.8)	200.0%	(2.7)	(1.4)	(1.3)	79.5 %
Total net sales	\$ 1,114.0	\$ 741.4	\$ 372.6	50.3%	\$ 1,114.0	\$ 1,080.3	\$ 33.7	3.1 %

Historical Sales

Sales for the nine months ended September 30, 2017 were \$1,114.0 million, an increase of \$372.6 million, or 50.3%, compared to sales of \$741.4 million for the nine months ended September 30, 2016. The increase in sales within our performance materials and chemicals segment was due to the inclusion of legacy PQ sales of \$818.2 million in our results of operations for the nine months ended September 30, 2017 as compared to legacy PQ sales of \$462.1 million in our results of operations for the period of May 4, 2016 through September 30, 2016. The increase in sales within our environmental catalysts and services segment was due to the inclusion of legacy PQ sales of \$52.3 million in our results of operations for the nine months ended September 30, 2017 as compared to \$33.1 million of legacy PQ sales in our results of operations for the period of May 4, 2016 through September 30, 2016 and an increase of \$19.2 million in our refining services product group. The increase in our refining services product group was primarily driven by higher average selling prices of \$12.6 million and increased volumes of \$6.6 million. The increase in average selling price was driven by the higher realization from sulfuric acid regeneration contract renewals and the increase in volumes was due to an increased demand for virgin sulfuric acid.

Pro Forma Sales

Performance Materials & Chemicals: Sales in performance materials and chemicals for the nine months ended September 30, 2017 were \$765.9 million, an increase of \$27.8 million, or 3.7%, compared to sales of \$738.1 million for the nine months ended September 30, 2016. The increase in sales was primarily due to the Sovitec acquisition, which contributed \$17.2 million in sales, higher average selling price and customer mix of \$9.3 million and favorable volumes of \$3.6 million, which was partially offset by the unfavorable effects of foreign currency translation of \$2.4 million.

The higher average selling price was principally a result of favorable U.S. dollar denominated sales and U.S. dollar cost pass through pricing in certain foreign locations. The increase in volumes within performance materials and chemicals was primarily driven by higher sodium silicate industrial demand and an increased silicas demand in the personal care industry, which was partially offset by lower North America highway sales as well as lower conductive sales volumes due to timing of product life cycles in the electronics markets. The stronger U.S. dollar compared to the British pound unfavorably impacted our sales which was partly offset by a stronger Brazilian Real which favorably impacted our sales.

Environmental Catalysts & Services: Sales in environmental catalysts and services for the nine months ended September 30, 2017 were \$350.8 million, an increase of \$7.2 million, or 2.1%, compared to sales of \$343.6 million for the nine months ended September 30, 2016. The increase in sales was primarily due to higher average selling price and customer mix of \$14.9 million, which was partially offset by lower volumes of \$6.8 million and the unfavorable effects of foreign currency translation of \$0.9 million.

The higher average selling price and customer mix was driven by the higher realization from sulfuric acid regeneration contract renewals partly offset by unfavorable virgin sulfuric acid pricing due to the mix of customers. The decrease in volumes was driven by

lower chemical catalysts sales due to record methyl methacrylate sales volumes in the prior year and lower high-density polyethylene demand, which was partially offset by stronger virgin sulfuric acid sales volumes due to the timing of our customer's plant turnarounds.

Gross Profit

Historical: Gross profit for the nine months ended September 30, 2017 was \$292.7 million, an increase of \$109.0 million, or 59.3%, compared with \$183.7 million for the nine months ended September 30, 2016. The increase in gross profit was due to \$196.1 million attributable to the inclusion of legacy PQ gross profit in our results of operations for the nine months ended September 30, 2017 as compared to legacy PQ gross profit of \$91.6 million in our results of operations for the period of May 4, 2016 through September 30, 2016 and an increase of \$11.0 million from our refining services product group. The increase in our refining services gross profit was due to favorable pricing of \$12.6 million and higher volumes of \$4.7 million, which was partially offset by higher manufacturing costs of \$4.9 million and higher depreciation expense of \$1.4 million.

The favorable pricing was due to higher realization from sulfuric acid regeneration contract renewals. The increase in volume was driven by higher virgin sulfuric acid shipments to the mining industry.

Pro Forma: Gross profit for the nine months ended September 30, 2017 was \$292.7 million, an increase of \$3.6 million, or 1.2%, compared with \$289.1 million for the nine months ended September 30, 2016. The increase in gross profit was due to favorable pricing of \$24.2 million, \$4.7 million related to the Sovitec acquisition and higher volumes of \$2.9 million, which was partially offset by higher depreciation expense of \$14.6 million, higher manufacturing costs of \$9.0 million, unfavorable product mix of \$3.2 million and the unfavorable effects of foreign currency translation of \$1.4 million.

The greater average selling price was a result of the positive impact of U.S. dollar denominated sales and U.S. dollar pass through pricing in certain foreign locations and higher realization from sulfuric acid regeneration customer contracts, partially offset by unfavorable virgin sulfuric acid customer mix. Higher manufacturing costs were primarily driven by increased costs to support the start-up of the ThermoDrop® production facility for which the product offering was released for sale towards the end of the second quarter of 2017, and higher production and labor inflation costs. The unfavorable product mix is due to the effect of higher methyl methacrylate sales volumes through the nine months ended September 30, 2016.

Selling, General and Administrative Expenses

Historical: Selling, general and administrative expenses for the nine months ended September 30, 2017 were \$105.9 million, an increase of \$31.9 million, or 43.1%, compared with \$74.0 million for the nine months ended September 30, 2016. The increase in selling, general and administrative expenses was due to \$89.8 million attributable to the inclusion of legacy PQ selling, general and administrative expenses in our results of operations for the nine months ended September 30, 2017 as compared to legacy PQ selling, general and administrative expenses of \$49.1 million in our results of operations for the period of May 4, 2016 through September 30, 2016. This was partly offset by \$8.7 million of lower selling, general and administrative expenses as a result of cost reduction initiatives.

Pro Forma: Selling, general and administrative expenses for the nine months ended September 30, 2017 were \$105.9 million, a decrease of \$5.6 million, or 5.0%, compared with \$111.5 million for the nine months ended September 30, 2016. The reduction in selling, general and administrative expenses primarily related to our cost reduction initiatives.

Other Operating Expense, Net

Historical: Other operating expense, net for the nine months ended September 30, 2017 was \$47.2 million, an increase of \$6.6 million, or 16.3%, compared with \$40.6 million for the nine months ended September 30, 2016. The increase in other operating expense, net was due to \$35.7 million attributable to the inclusion of legacy PQ other operating expense, net in our results of operations for the nine months ended September 30, 2017 as compared to legacy PQ other operating expense, net of \$22.6 million in our results of operations for the period of May 4, 2016 through September 30, 2016. Included in other operating expense, net was an increase in losses on the sale of assets of \$2.1 million, which was partly offset by \$6.8 million of lower restructuring and severance related costs and \$2.8 million in lower transaction related costs.

Pro Forma: Other operating expense, net for the nine months ended September 30, 2017 was \$47.2 million, a decrease of \$8.7 million, or 15.6%, compared with \$55.9 million for the nine months ended September 30, 2016. The decrease in other operating expense, net was due to \$10.5 million of lower restructuring and severance related costs associated with the Business Combination and \$1.3 million of lower environmental remediation charges, which were offset by \$3.3 million in restructuring and plant closure costs incurred during the nine months ended September 30, 2017.

Equity in Net Income of Affiliated Companies

Historical: Equity in net income of affiliated companies for the nine months ended September 30, 2017 was \$24.9 million, an increase of \$34.2 million, compared with a loss of \$9.3 million for the nine months ended September 30, 2016. The increase was primarily due to \$31.0 million of earnings generated by our Zeolyst Joint Venture during the nine months ended September 30, 2017 as compared

to \$15.1 million for the period of May 4, 2016 through September 30, 2016 and \$17.7 million of lower amortization expense on the fair value step-up of the underlying assets of our Zeolyst Joint Venture.

Pro Forma: Equity in net income of affiliated companies for the nine months ended September 30, 2017 was \$24.9 million, an increase of \$16.0 million, compared with income of \$8.9 million for the nine months ended September 30, 2016. The increase in earnings generated by our Zeolyst Joint Venture was due to higher sales for emission control and increased sales of aromatic catalysts.

Interest Expense, Net

Historical: Interest expense, net for the nine months ended September 30, 2017 was \$144.0 million, an increase of \$49.6 million, as compared with \$94.4 million for the nine months ended September 30, 2016. Interest expense increased primarily due to higher third-party interest expense under our debt structure compared to the legacy Eco debt structure on a stand-alone basis.

Pro Forma: Interest expense, net for the nine months ended September 30, 2017 was \$144.0 million, an increase of \$1.4 million, as compared with \$142.6 million for the nine months ended September 30, 2016.

Debt Extinguishment Costs

Historical: Debt extinguishment costs for the nine months ended September 30, 2017 and 2016 were \$0.5 million and \$11.9 million, respectively. On August 7, 2017, we re-priced the existing U.S. dollar-denominated tranche and existing Euro-denominated tranche of our term loans to reduce the applicable interest rates. The company recorded \$0.2 million of new creditor and third-party financing fees as debt extinguishment costs. In addition, previous unamortized deferred financing costs of \$0.1 million and original issue discount of \$0.2 million associated with the old debt were written off as debt extinguishment costs. On May 4, 2016, and concurrently with the consummation of the Business Combination, the company refinanced its existing credit facilities. The company recorded \$4.6 million of new creditor and third-party financing fees as debt extinguishment costs. In addition, previous unamortized deferred financing costs of \$6.3 million and original issue discount of \$1.0 million associated with the old debt were written off as debt extinguishment costs.

Other Expense, Net

Historical: Other expense, net was \$21.7 million for the nine months ended September 30, 2017, an unfavorable change of \$14.5 million, compared with other expense, net of \$7.2 million for the nine months ended September 30, 2016. The change in other expense, net primarily consisted of \$21.5 million of foreign currency losses for the nine months ended September 30, 2017 as compared to foreign currency losses of \$6.2 million for the nine months ended September 30, 2016.

Pro Forma: Other expense, net was \$21.7 million for the nine months ended September 30, 2017, an unfavorable change of \$20.0 million, compared with other expense, net of \$1.7 million for the nine months ended September 30, 2016. The change in other income, net primarily consisted of \$21.5 million of foreign currency losses for the nine months ended September 30, 2017 as compared to foreign currency losses of \$0.9 million for the nine months ended September 30, 2016.

Provision for Income Taxes

Historical: The provision for income taxes for the nine months ended September 30, 2017 was \$5.3 million compared to a \$36.0 million provision for the nine months ended September 30, 2016. The effective income tax rate for the nine months ended September 30, 2017 was (304.2)% compared to (67.1)% for the nine months ended September 30, 2016. The difference between the U.S. federal statutory income tax rate and our effective income tax rate for the nine months ended September 30, 2017 was mainly due to the tax effect of our foreign currency exchange loss recognized as a discrete item for the purposes of calculating the effective tax rate as well as the tax effect of repatriating foreign earnings back to the U.S. as dividends, partially offset by lower tax rates in foreign jurisdictions as compared to the U.S. federal tax rate, foreign withholding taxes, state taxes and non-deductible transaction costs. The difference between the U.S. federal statutory income tax rate and our effective income tax rate for the nine months ended September 30, 2016 was mainly due to the tax effect of our foreign currency exchange loss recognized as a discrete item for the purposes of calculating the effective tax rate as well as the tax effect of repatriating foreign earnings back to the U.S. as dividends, partially offset by lower tax rates in foreign jurisdictions as compared to the U.S. federal tax rate, foreign withholding taxes, state taxes, non-deductible transaction costs, and change in tax status of legacy Eco. Prior to the Business Combination on May 4, 2016, legacy Eco was a single member limited liability company and taxed as a partnership for federal and state income tax purposes. As such, all income tax liabilities and/or benefits of legacy Eco were passed through to its members. Because legacy Eco was taxed as a partnership, it did not record deferred taxes on the basis difference on its financial statements. Following the Business Combination on May 4, 2016, legacy Eco had a change in tax status and is now taxed as a C-Corporation subject to federal and state corporate level income taxes at prevailing corporate rates. Minimal taxes were recorded on the book losses incurred by legacy Eco during the periods preceding the Business Combination included in the nine months ended September 30, 2016, causing the fluctuation to the Company's effective income tax rate in comparison to the taxes recorded for the nine months ended September 30, 2016.

Pro Forma: The provision for income taxes for the nine months ended September 30, 2017 was \$5.3 million compared to a \$42.3 million provision for the nine months ended September 30, 2016. The effective income tax rate for the nine months ended September 30, 2017 was (304.2)% compared to (308.4)% for the nine months ended September 30, 2016. The difference between the U.S. federal

statutory income tax rate and our effective income tax rate for the nine months ended September 30, 2017 was mainly due to the tax effect of our foreign currency exchange loss recognized as a discrete item for the purposes of calculating the effective tax rate as well as the tax effect of repatriating foreign earnings back to the U.S. as dividends, partially offset by lower tax rates in foreign jurisdictions as compared to the U.S. federal tax rate, state taxes and foreign withholdings taxes. The difference between the U.S. federal statutory income tax rate and our effective income tax rate for the nine months ended September 30, 2016 was mainly due to the tax effect of our foreign currency exchange loss recognized as a discrete item for the purposes of calculating the effective tax rate as well as the tax effect of repatriating foreign earnings back to the U.S. as dividends, partially offset by lower tax rates in foreign jurisdictions as compared to the U.S. federal tax rate, foreign withholding taxes, state taxes, non-deductible transaction costs, and change in tax status of legacy Eco. Prior to the Business Combination on May 4, 2016, legacy Eco was a single member limited liability company and taxed as a partnership for federal and state income tax purposes. As such, all income tax liabilities and/or benefits of legacy Eco were passed through to its members. Because legacy Eco was taxed as a partnership, it did not record deferred taxes on the basis difference on its financial statements. Following the Business Combination on May 4, 2016, legacy Eco had a change in tax status and is now taxed as a C-Corporation subject to federal and state corporate level income taxes at prevailing corporate rates. Minimal taxes were recorded on the book losses incurred by legacy Eco during the periods preceding the Business Combination included in the nine months ended September 30, 2016, causing the fluctuation to the Company's effective income tax rate in comparison to the taxes recorded for the nine months ended September 30, 2016.

Net Loss Attributable to PQ Group Holdings

Historical: For the foregoing reasons and after the effect of the non-controlling interest in earnings of subsidiaries for each period presented, net loss attributable to PQ Group Holdings Inc. was \$7.4 million for the nine months ended September 30, 2017 as compared to a net loss of \$90.4 million for the nine months ended September 30, 2016.

Pro Forma: For the foregoing reasons and after the effect of the non-controlling interest in earnings of subsidiaries for each period presented, net loss attributable to PQ Group Holdings Inc. was \$7.4 million for the nine months ended September 30, 2017 as compared to a net loss of \$57.4 million for the nine months ended September 30, 2016.

Historical and Pro Forma Adjusted EBITDA

Summarized historical and pro forma Segment Adjusted EBITDA information is shown below in the following table:

	Historical		Pro Forma		Change	
	Nine Months Ended September 30,					
	2017	2016	\$	%		
Segment Adjusted EBITDA ⁽¹⁾ :						
Performance Materials & Chemicals	\$ 184.8	\$ 184.3	\$ 0.5	0.3%		
Environmental Catalysts & Services ⁽²⁾	182.6	160.0	22.6	14.1%		
Total Segment Adjusted EBITDA ⁽³⁾	367.4	344.3	23.1	6.7%		
Unallocated corporate costs	(23.5)	(22.8)	(0.7)	3.1%		
Total Adjusted EBITDA ⁽³⁾	\$ 343.9	\$ 321.5	\$ 22.4	7.0%		

⁽¹⁾ We define Segment Adjusted EBITDA as EBITDA adjusted for certain items as noted in the reconciliation below. Our management evaluates the performance of our segments and allocates resources based primarily on Segment Adjusted EBITDA. Segment Adjusted EBITDA does not represent cash flow for periods presented and should not be considered as an alternative to net income as an indicator of our operating performance or as an alternative to cash flows as a source of liquidity. Segment Adjusted EBITDA may not be comparable with EBITDA or Adjusted EBITDA as defined by other companies.

⁽²⁾ The Adjusted EBITDA from the Zeolyst Joint Venture included in the environmental catalyst and services segment is \$39.7 million for the nine months ended September 30, 2017, which includes \$24.6 million of equity in net income plus \$6.9 million of amortization of investment in affiliate step-up plus \$8.1 million of joint venture depreciation, amortization and interest. The pro forma Adjusted EBITDA from the Zeolyst Joint Venture included in the environmental catalyst and services segment is \$31.9 million for the nine months ended September 30, 2016, which includes \$8.7 million of equity in net income plus \$15.3 million of amortization of investment in affiliate step-up plus \$7.9 million of joint venture depreciation, amortization and interest.

⁽³⁾ Our total Segment Adjusted EBITDA differs from our total consolidated Adjusted EBITDA due to unallocated corporate expenses.

Adjusted EBITDA for the nine months ended September 30, 2017 was \$343.9 million, an increase of \$22.4 million, or 7.0%, compared with \$321.5 million on a pro forma basis for the nine months ended September 30, 2016.

Performance Materials & Chemicals: Adjusted EBITDA for the nine months ended September 30, 2017 was \$184.8 million, an increase of \$0.5 million, or 0.3%, compared with \$184.3 million on a pro forma basis for the nine months ended September 30, 2016.

The increase in Adjusted EBITDA was due to stronger demand in North America industrials and earnings from the Sovitec acquisition partly offset by start-up costs for the new ThermoDrop® production facility.

Environmental Catalysts & Services: Adjusted EBITDA for the nine months ended September 30, 2017 was \$182.6 million, an increase of \$22.6 million, or 14.1%, compared with \$160.0 million on a pro forma basis for the nine months ended September 30, 2016.

The increase in Adjusted EBITDA was driven primarily by higher pricing from renegotiated regeneration services contracts and increased earnings generated by our Zeolyst Joint Venture due to higher sales volumes of aromatic catalyst and catalyst sales for emission control.

A reconciliation of Segment Adjusted EBITDA and pro forma Segment Adjusted EBITDA to net loss and pro forma net loss attributable to PQ Group Holdings is as follows:

	Historical		Pro Forma	
	Nine Months Ended			
	September 30,			
	2017		2016	
Reconciliation of net loss attributable to PQ Group Holdings Inc. to Segment Adjusted EBITDA				
Net loss attributable to PQ Group Holdings Inc.	\$	(7.4)	\$	(57.4)
Provision for income taxes		5.3		42.3
Interest expense, net		144.0		142.6
Depreciation and amortization		129.1		123.2
EBITDA		271.0		250.7
Joint venture depreciation, amortization and interest ^(a)		8.1		7.9
Amortization of investment in affiliate step-up ^(b)		6.9		15.3
Amortization of inventory step-up ^(c)		0.9		5.8
Debt extinguishment costs		0.5		—
Net loss on asset disposals ^(d)		6.4		2.9
Foreign currency exchange loss ^(e)		21.6		1.0
Non-cash revaluation of inventory, including LIFO		3.2		0.8
Management advisory fees ^(f)		3.8		4.0
Transaction related costs ^(g)		5.3		5.3
Equity-based and other non-cash compensation		3.9		4.4
Restructuring, integration and business optimization expenses ^(h)		8.0		16.2
Defined benefit plan pension cost ⁽ⁱ⁾		2.2		4.0
Other ^(j)		2.1		3.2
Adjusted EBITDA		343.9		321.5
Unallocated corporate expenses		23.5		22.8
Total Segment Adjusted EBITDA	\$	367.4	\$	344.3

(a) We use Adjusted EBITDA as a performance measure to evaluate our financial results. Because our environmental catalysts and services segment includes our 50% interest in our Zeolyst Joint Venture, we include an adjustment for our 50% proportionate share of depreciation, amortization and interest expense of our Zeolyst Joint Venture.

(b) Represents the amortization of the fair value adjustments associated with the equity affiliate investment in our Zeolyst Joint Venture as a result of the Business Combination. We determined the fair value of the equity affiliate investment and the fair value step-up was then attributed to the underlying assets of our Zeolyst Joint Venture. Amortization is primarily related to the fair value adjustments associated with inventory, fixed assets and intangible assets, such as customer relationships, formulations and product technology.

(c) As a result of the Business Combination, there was a step-up in the fair value of inventory at PQ Holdings, which is amortized through cost of goods sold in the income statement.

(d) We do not have a history of significant asset disposals. However, when asset disposals occur, we remove the impact of net gain/loss of the disposed asset because such impact primarily reflects the non-cash write-off of long-lived assets no longer in use.

- (e) Reflects the exclusion of the negative or positive transaction gains and losses of foreign currency in the income statement primarily related to the Euro denominated term loan and the non-permanent intercompany debt denominated in local currency translated to U.S. dollars.
- (f) Reflects consulting fees paid to CCMP and affiliates of INEOS for consulting services that include certain financial advisory and management services. These payments ceased as of the closing of our initial public offering.
- (g) Relates to certain transaction costs described elsewhere in our consolidated financial statements as well as other costs related to several transactions that are either completed, pending or abandoned and that we believe are not representative of our ongoing business operations.
- (h) Includes the impact of restructuring, integration and business optimization expenses that are related to specific, one-time items, including severance for a reduction in force and post-merger integration costs that are not expected to recur.
- (i) Represents adjustments for defined benefit pension plan costs in our income statement. More than two-thirds of our defined benefit pension plan obligations are under defined benefit pension plans that are frozen and the remaining obligations primarily relate to plans operated in certain of our non-U.S. locations that, pursuant to jurisdictional requirements, cannot be frozen. As such, we do not view such expenses as core to our ongoing business operations.
- (j) Other costs consist of certain expenses that are not core to our ongoing business operations and are generally related to specific, one-time items, including environmental remediation-related costs associated with the legacy operations of our business prior to the Business Combination, capital and franchise taxes, non-cash asset retirement obligation accretion and the initial implementation of procedures to comply with Section 404 of the Sarbanes-Oxley Act.

Adjusted Net Income

Summarized adjusted net income information is shown below in the following table:

	Historical	Pro Forma
	Nine Months Ended September 30,	
	2017	2016
Reconciliation of net loss attributable to PQ Group Holdings Inc. to Adjusted Net Income ^{(1) (2)}		
Net loss attributable to PQ Group Holdings Inc.	\$ (7.4)	\$ (57.4)
Amortization of investment in affiliate step-up ^(b)	4.0	9.4
Amortization of inventory step-up ^(c)	0.5	3.6
Debt extinguishment costs	0.3	—
Net loss on asset disposals ^(d)	3.7	1.8
Foreign currency exchange loss ^(e)	14.9	2.5
Non-cash revaluation of inventory, including LIFO	1.9	0.5
Management advisory fees ^(f)	2.2	2.4
Transaction related costs ^(g)	3.1	3.2
Equity-based and other non-cash compensation	2.2	2.7
Restructuring, integration and business optimization expenses ^(h)	4.6	9.9
Defined benefit plan pension cost ⁽ⁱ⁾	1.3	2.5
Other ^(j)	1.2	2.0
Adjusted net income	<u>\$ 32.5</u>	<u>\$ (16.9)</u>

(1) We define adjusted net income as net loss attributable to PQ Group Holdings adjusted for non-operating income or expense and the impact of certain non-cash or other items that are included in net income that we do not consider indicative of our ongoing operating performance. Adjusted net income is presented as a key performance indicator as we believe it will enhance a prospective investor's understanding of our results of operations and financial condition. Adjusted net income may not be comparable with net income or adjusted net income as defined by other companies.

(2) Refer to the Adjusted EBITDA notes above for more information with respect to each adjustment.

The adjustments to net loss attributable to PQ Group Holdings Inc. are shown net of applicable tax rates of 42.1% and 38.8% for the nine months ended September 30, 2017 and September 30, 2016, respectively, except for the foreign currency exchange loss for which the tax is calculated as a discrete item using the applicable statutory income tax rates.

Financial Condition, Liquidity and Capital Resources

Our primary sources of liquidity consist of cash flow from operations, existing cash balances as well as funds available under our asset based lending revolving credit facility. We expect that ongoing requirements for debt service and capital expenditures will be funded from these sources of funds. Our primary liquidity requirements include funding working capital requirements (primarily inventory and accounts receivable, net of accounts payable and other accrued liabilities), debt service requirements and capital expenditures. Our capital expenditures include both maintenance of business, which include spending on maintenance of business and health, safety, environmental initiatives and cost savings initiatives as well as expansion, which includes spending to drive organic sales growth. As reported for the nine months ended September 30, 2017, we spent approximately \$66.7 million in maintenance capital expenditures and \$18.2 million in expansion capital expenditures. For the nine months ended September 30, 2016, we spent approximately \$55.9 million in maintenance capital expenditures and \$19.5 million in expansion capital expenditures.

We believe that our existing cash, cash equivalents and cash flows from operations, combined with availability under our asset based lending revolving credit facility, will be sufficient to meet our presently anticipated future cash needs for at least the next 12 months. We may also pursue strategic acquisition opportunities, which may impact our future cash requirements. We may, from time to time, increase borrowings under our asset based lending revolving credit facility to meet our future cash needs. As of September 30, 2017, we had cash and cash equivalents of \$68.8 million and availability of \$140.6 million under our asset based lending revolving credit facility, after giving effect to \$19.6 million of outstanding letters of credit and \$35.0 million of revolving credit facility borrowings, for a total available liquidity of \$209.4 million.

As of September 30, 2017, our total indebtedness was \$2,703.1 million, with up to \$140.6 million of available borrowings under our asset based lending revolving credit facility. Our liquidity requirements are significant, primarily due to debt service requirements. As reported, our cash interest expense for the nine months ended September 30, 2017 and 2016 was approximately \$118.8 million and \$56.9 million, respectively. Before any impact of hedges, a one percent change in assumed interest rates for our variable interest credit facilities would have an annual impact of approximately \$18.1 million on interest expense.

On October 3, 2017, we completed the initial public offering of our common stock and issued and sold 29,000,000 shares of our common stock at a public offering price of \$17.50 per share, for aggregate gross proceeds of \$507.5 million. The aggregate net proceeds received by us from the offering were approximately \$480.5 million, net of underwriting discounts of \$24.1 million and offering expenses of \$2.9 million, net of reimbursements. The net proceeds were used to repay \$446.2 million in aggregate principal amount of PQ Corporation's Floating Rate Senior Unsecured Notes due 2022, together with accrued and unpaid interest and applicable redemption premiums. We recorded approximately \$40.5 million of debt extinguishment costs related to the repayment of the Floating Rate Senior Unsecured Notes due 2022 in October 2017. We anticipate the redemption of the Floating Rate Senior Unsecured Notes will reduce our annual interest expense by approximately \$53.9 million.

Our ability to make payments on and to refinance our indebtedness will depend on our ability to generate cash in the future. We believe that our cash on hand, together with cash from operations and, if required, borrowings under our asset based lending revolving credit facility, will be sufficient for our cash requirements for the next twelve months.

Cash Flow

	Nine Months Ended September 30,	
	2017	2016
(in millions)		
Net cash provided by (used in)		
Operating activities	\$ 109.8	\$ 89.3
Investing activities	(134.5)	(1,861.6)
Financing activities	29.2	1,821.4
Effect of exchange rate changes on cash and cash equivalents	(6.4)	(2.4)
Net change in cash and cash equivalents	(1.9)	46.7
Cash and cash equivalents at beginning of period	70.7	25.2
Cash and cash equivalents at end of period	\$ 68.8	\$ 71.9

	Nine Months Ended September 30,	
	2017	2016
(in millions)		
Working capital changes that provided (used) cash:		
Receivables	\$ (28.9)	\$ 3.5
Inventories	4.9	13.8
Prepays and other current assets	(6.0)	(0.8)
Accounts payable	(9.0)	(7.3)
Accrued liabilities	13.5	10.1
Other, net	(2.5)	(0.8)
	\$ (28.0)	\$ 18.5

Net cash provided by operating activities was \$109.8 million for the nine months ended September 30, 2017, compared to \$89.3 million provided for the nine months ended September 30, 2016. Cash generated by operating earnings after giving effect to non-cash items recognized in the income statement during the period was higher during the nine months ended September 30, 2017 by \$67.1 million compared to the same period in the prior year. Cash provided by working capital during the nine months ended September 30, 2017 was unfavorable compared to the nine months ended September 30, 2016. Working capital for the nine months ended September 30, 2017 used cash of \$28.0 million, compared to cash provided of \$18.5 million for the nine months ended September 30, 2016.

The increase in cash generated by operating earnings after giving effect to non-cash items of \$67.1 million as compared to the prior year period was primarily due to the inclusion of legacy PQ cash from operations for the nine months ended September 30, 2017 as compared to the period from May 4, 2016 through September 30, 2016 in the prior year. This resulted in a decrease in our net loss of \$82.7 million, an increase of \$43.5 million of depreciation and amortization expense, \$18.9 million of dividends received from affiliated companies and \$15.4 million of foreign currency losses, which was partially offset by \$34.2 million of net income from affiliated companies, \$31.2 million of deferred income tax benefits, \$22.6 million in lower acquisition accounting valuation adjustments on inventory sold and \$5.4 million of pension and postretirement plan net funding.

The decrease in cash from working capital of \$46.5 million compared to the prior year was primarily due to the inclusion of legacy PQ working capital for the nine months ended September 30, 2017 as compared to the period from May 4, 2016 through September 30, 2016 in the prior year. This resulted in unfavorable changes in accounts receivable, inventory, prepaid and other current assets and accounts payable. The unfavorable change was partially offset by favorable changes in accrued liabilities.

In addition to the inclusion of a full period of legacy PQ working capital, the unfavorable change in accounts receivable was a result of higher accounts receivables from higher current year pricing and volumes. The unfavorable change in inventory was driven by inventory build for our new ThermoDrop® product offering. The unfavorable change in accounts payable is due to timing of payments for capital expenditures, timing of plant turnaround costs and higher raw material costs. The favorable change in accrued liabilities is primarily due to the timing of accrued interest under our new debt structure.

Net cash used in investing activities was \$134.5 million for the nine months ended September 30, 2017, compared to cash used of \$1,861.6 million during the same period in 2016. Current year uses of cash include utilizing \$90.2 million to fund capital expenditures and \$41.6 million to fund the Sovitec acquisition. Prior year uses of cash include utilizing \$1,777.7 million to fund the Business Combination and \$69.8 million to fund capital expenditures.

Net cash provided by financing activities was \$29.2 million for the nine months ended September 30, 2017, compared to net cash provided of \$1,821.4 million during the same period in 2016. The change in cash from financing activities was primarily driven by the

issuance of \$2,296.8 million in debt, net of financing fees, related to the Business Combination in the prior year, partially offset by \$465.7 million in lower debt repayments and \$39.6 million in net revolver borrowings in the current year.

Debt

	September 30, 2017	December 31, 2016
	(in millions)	
Term Loan Facility (U.S. dollar denominated)	\$ 918.5	\$ 925.4
Term Loan Facility (Euro denominated)	331.4	297.3
6.75% Senior Secured Notes due 2022	625.0	625.0
Floating Rate Senior Unsecured Notes due 2022	525.0	525.0
8.5% Senior Notes due 2022	200.0	200.0
ABL Facility	35.0	—
Other	68.2	45.2
Total debt	2,703.1	2,617.9
Original issue discount	(26.5)	(28.5)
Deferred financing costs	(24.8)	(27.3)
Total debt, net of original issue discount and deferred financing costs	2,651.8	2,562.1
Less: current portion	(54.3)	(14.5)
Total long-term debt	\$ 2,597.5	\$ 2,547.6

As of September 30, 2017, our total debt was \$2,703.1 million, including \$16.4 million of other foreign debt and \$51.8 million of notes payable for the NMTC financing and excluding the original issue discount of \$26.5 million and deferred financing fees of \$24.8 million for our senior secured credit facilities. Our net debt as of September 30, 2017 was \$2,703.7 million, excluding \$16.4 million of other foreign debt and \$51.8 million of NMTC notes payable, and net of cash of \$68.8 million. We may seek, subject to market conditions and other factors, opportunities to repurchase, refinance or otherwise reprice our debt.

Capital Expenditures

Maintenance capital expenditures include spending on maintenance of business, cost savings initiatives and health, safety and environmental initiatives. Expansion capital expenditures include spending to drive organic sales growth. These capital expenditures represent our “book” capital expenditures for which the company has recorded, but not necessarily paid for the capital expenditures.

	Nine Months Ended September 30,	
	2017	2016
	(in millions)	
Maintenance capital expenditures	\$ 66.7	\$ 55.9
Expansion capital expenditures	18.2	19.5
Total capital expenditures	<u>\$ 84.9</u>	<u>\$ 75.4</u>

Capital expenditures remained at a level sufficient for required maintenance and certain expansion growth initiatives during these periods.

Pension Funding

We paid \$7.5 million and \$2.3 million in cash contributions into our defined benefit pension plans and other post-retirement plans during the nine months ended September 30, 2017 and 2016, respectively. The periodic pension expense was \$2.6 million and \$2.7 million for those same periods, respectively.

Off-Balance Sheet Arrangements

We had \$19.6 million of outstanding letters of credit on our revolver facility as of September 30, 2017.

Critical Accounting Policies and Estimates

We prepare our condensed consolidated financial statements in conformity with GAAP and our significant accounting policies are described in Note 2 to our audited consolidated financial statements included in our Prospectus filed pursuant to Rule 424(b)(4) with the SEC on October 2, 2017. The preparation of financial statements in conformity with GAAP requires us to make estimates and assumptions that affect reported amounts and related disclosures. We base our estimates and judgments on historical experience and other relevant factors that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. We evaluate our critical accounting estimates, assumptions and judgments on an ongoing basis.

There has been no material change in our critical accounting policies and use of estimates from those described under “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included in our Prospectus filed pursuant to Rule 424(b)(4) with the SEC on October 2, 2017.

Accounting Standards Not Yet Adopted

Refer to Note 2 in our September 30, 2017 unaudited condensed consolidated financial statements for a description of recent accounting standards.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.

Our major market risk exposure is potential losses arising from changing rates and prices regarding foreign currency exchange rate risk, interest rate risk, commodity price risk and credit risk. The audit committee of our board of directors regularly reviews foreign exchange, interest rate and commodity hedging activity and monitors compliance with our hedging policy. We do not use financial instruments for speculative purposes, and we limit our hedging activity to the underlying economic exposure.

There has been no material change in the foreign exchange risk, interest rate risk, commodity risk or credit risk discussed in “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included in our Prospectus filed pursuant to Rule 424(b)(4) with the SEC on October 2, 2017.

ITEM 4. CONTROLS AND PROCEDURES.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of September 30, 2017, the end of the period covered by this Quarterly Report on Form 10-Q.

The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (“Exchange Act”), means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective.

PART II—OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

From time to time we may be subject to various legal claims and proceedings incidental to the normal conduct of business, relating to such matters as personal injury, product liability and warranty claims, waste disposal practices, release of chemicals into the environment and other matters that may arise in the ordinary course of our business. We currently believe that there is no litigation pending that is likely to have a material adverse effect on our business. Regardless of the outcome, legal proceedings can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors. Refer to Note 16 of our September 30, 2017 unaudited condensed consolidated financial statements for additional information regarding the Company’s legal proceedings.

ITEM 1A. RISK FACTORS

There has been no material change from the risk factors described in our Prospectus filed pursuant to Rule 424(b)(4) with the SEC on October 2, 2017.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS.

Recent Sales of Unregistered Securities

During the three months ended September 30, 2017, and after giving effect to the automatic conversion of our Class B common stock into shares of our common stock in connection with the initial public offering, we issued an aggregate of 24,750 shares of our common stock subject to vesting conditions under the PQ Group Holdings Inc. Stock Incentive Plan. The shares were issued without registration in reliance on the exemptions afforded by Section 4(a)(2) of the Securities Act and Rule 701 promulgated thereunder.

Use of Proceeds from Initial Public Offering of Common Stock

On September 28, 2017, our Registration Statement on Form S-1, as amended (File No. 333-218650), relating to our initial public offering of 29,000,000 shares of common stock was declared effective by the SEC. On October 3, 2017, we closed the sale of 29,000,000 shares of our common stock at a price of \$17.50. Morgan Stanley & Co. LLC, Goldman Sachs & Co. LLC, Citigroup Global Markets Inc. and Credit Suisse Securities (USA) LLC served as joint book-running managers of the offering. The offering commenced on September 28, 2017 and closed on October 3, 2017.

We raised a total of \$507.5 million in gross proceeds in the initial public offering, or approximately \$480.5 million in net proceeds after deducting underwriting discounts and commissions of \$24.1 million and \$2.9 million of offering-related expenses, net of reimbursements. On October 3, 2017, all of the net proceeds from the offering were used to redeem \$446.2 million in aggregate principal amount of PQ Corporation’s Floating Rate Senior Unsecured Notes due 2022 (the “Floating Rate Senior Unsecured Notes”), together with accrued and unpaid interest, and applicable redemption premiums. Andrew Currie, a member of our board of directors, held \$4.0 million in principal amount of the Floating Rate Senior Unsecured Notes, and, as a result, received a portion of the net proceeds from the initial public offering.

ITEM 6. EXHIBITS.

The following exhibits are being filed or furnished as part of this Quarterly Report on Form 10-Q:

<u>Exhibit No.</u>	<u>Description</u>
3.1	Second Restated Certificate of Incorporation of PQ Group Holdings Inc.
3.2	Amended and Restated Bylaws of PQ Group Holdings Inc. (Incorporated by reference to Exhibit 3.2 of the Company's Third Amendment to its Registration Statement on Form S-1 dated September 1, 2017.)
31.1	Certification of Chief Executive Officer of PQ Group Holdings Inc. pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer of PQ Group Holdings Inc. pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer of PQ Group Holdings Inc. pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2	Certification of Chief Financial Officer of PQ Group Holdings Inc. pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Definition Linkbase Document.
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.

SIGNATURES

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.

PQ GROUP HOLDINGS INC.

Date: November 13, 2017

By: /s/ MICHAEL CREWS

Michael Crews

Executive Vice President and Chief Financial Officer

(Duly Authorized Officer and Principal Financial and Accounting Officer)

SECOND RESTATED CERTIFICATE OF INCORPORATION

OF

PQ GROUP HOLDINGS INC.

PQ Group Holdings Inc., a Delaware corporation (the "Corporation"), hereby certifies that this Second Restated Certificate of Incorporation has been duly adopted in accordance with Sections 242 and 245 of the General Corporation Law of the State of Delaware (the "DGCL"), and that:

A. The name of the Corporation is: PQ Group Holdings Inc.

B. The original Certificate of Incorporation of the Corporation was filed with the Secretary of State of Delaware on August 7, 2015 and was amended and restated on May 4, 2016, corrected on May 26, 2016 and further amended on September 22, 2017 (as so amended, restated and corrected, the "Original Certificate of Incorporation").

C. This Second Restated Certificate of Incorporation amends and restates the Original Certificate of Incorporation.

D. The Certificate of Incorporation upon the filing of this Second Restated Certificate of Incorporation, shall read as follows:

ARTICLE I -- NAME

The name of the corporation is PQ Group Holdings Inc. (the "Corporation").

ARTICLE II -- REGISTERED OFFICE AND AGENT

The address of the Corporation's registered office in the State of Delaware is 850 New Burton Road, Suite 201, Dover, Kent County, DE 19904. The name of the Corporation's registered agent at such address is Cogency Global Inc.

ARTICLE III -- PURPOSE

The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of the State of Delaware (the "DGCL").

ARTICLE IV -- CAPITALIZATION

(a) Authorized Shares. The total number of shares of stock which the Corporation shall have authority to issue is 500,000,000, consisting of 450,000,000 shares of Common Stock, par value \$0.01 per share ("Common Stock"), and 50,000,000 shares of Preferred Stock, par value \$0.01 per share ("Preferred Stock"). Such stock may be issued from time to time by the Corporation for such consideration as may be fixed by the board of directors of the Corporation (the "Board of Directors").

(b) Common Stock. Subject to the powers, preferences and rights of any Preferred Stock, including any series thereof, having any preference or priority over, or rights superior to, the Common Stock and except as otherwise provided by law and this Article IV, the holders of the Common Stock shall have and possess all powers and voting and other rights pertaining to the stock of the Corporation.

(i) *Voting*. Each holder of Common Stock, as such, shall be entitled to one vote for each share of Common Stock held of record by such holder on all matters on which stockholders generally are entitled to vote; provided, that, except as otherwise required by law, holders of Common Stock, as such, shall not be entitled to vote on any amendment to this Second Restated Certificate of Incorporation (including, but not limited to, any certificate of designations relating to any series of Preferred Stock) that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to this Second Restated Certificate of Incorporation (including, but not limited to, any certificate of designations relating to any series of Preferred Stock) or pursuant to the DGCL. There shall be no cumulative voting.

(ii) *Dividends*. Dividends may be declared and paid on the Common Stock from funds lawfully available therefor as and when determined by the Board of Directors and subject to any preferential dividend rights of any then outstanding Preferred Stock. Except as otherwise provided by the DGCL or this Second Restated Certificate of Incorporation, the holders of record of Common Stock shall share ratably in all dividends payable in cash, stock or otherwise and other distributions, whether in respect of liquidation or dissolution (voluntary or involuntary) or otherwise.

(iii) *No Preemptive Rights*. The holders of the Common Stock shall have no preemptive rights to subscribe for any shares of any class of stock of the Corporation whether now or hereafter authorized.

(iv) *No Conversion Rights*. The Common Stock shall not be convertible into, or exchangeable for, shares of any other class or classes or of any other series of the same class of the Corporation's capital stock.

(v) *Liquidation Rights*. Upon the dissolution or liquidation of the Corporation, whether voluntary or involuntary, holders of Common Stock will be entitled to receive all assets of the Corporation available for distribution to its stockholders, subject to any preferential rights of any then outstanding Preferred Stock. A merger or consolidation of the Corporation with or into any other corporation or other entity or a sale or conveyance of all or any part of the assets of the Corporation, in any such case which shall not in fact result in the liquidation of the Corporation and the distribution of assets to its stockholders, shall not be deemed to be a voluntary or involuntary liquidation or dissolution or winding up of the Corporation within the meaning of this Article IV(b)(v).

(c) Preferred Stock. Shares of Preferred Stock may be issued in one or more series, from time to time, with each such series to consist of such number of shares and to have such voting powers relative to other classes or series of Preferred Stock, if any, or Common Stock, full or limited or no voting powers, and such designations, preferences and relative, participating, optional or other special rights, and the qualifications, limitations or restrictions thereof, as shall be stated in the resolution or resolutions providing for the issuance of such series adopted by the Board of Directors, and the Board of Directors is hereby expressly vested with the authority, to the full extent now or hereafter provided by applicable law, to adopt any such resolution or resolutions. Except as otherwise provided in this Second Restated Certificate of Incorporation, no vote of the holders of the Preferred Stock or Common Stock shall be a prerequisite to the designation or issuance of any shares of any series of the Preferred Stock authorized by and complying with the conditions of this Second Restated Certificate of Incorporation, the right to have such vote being expressly waived by all present and future holders of the capital stock of the Corporation. Any shares of Preferred Stock that are redeemed, purchased or acquired by the Corporation may be reissued except as otherwise provided by law or this Second Restated Certificate of Incorporation. Different series of Preferred Stock shall not be construed to constitute different classes of shares for the purposes of voting by classes unless expressly provided in the resolution or resolutions providing for the issue of such series adopted by the Board of Directors.

(d) No Class Vote On Changes In Authorized Number of Shares Of Preferred Stock. Subject to the special rights of the holders of any series of Preferred Stock pursuant to the terms of this Second Restated Certificate of Incorporation, any certificate of designations or any resolution or resolutions providing for the issuance of such series of stock adopted by the Board of Directors, the number of authorized shares of Preferred Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the voting power of the outstanding shares of capital stock of the Corporation entitled to vote generally in the election of directors, voting together as a single class, irrespective of the provisions of Section 242(b)(2) of the DGCL.

ARTICLE V -- BOARD OF DIRECTORS

(a) Number of Directors; Vacancies and Newly Created Directorships. The number of directors constituting the Board of Directors shall be not fewer than three (3) and not more than fifteen (15), each of whom shall be a natural person. All elections of directors shall be determined by a plurality of the votes cast. Subject to the special rights of the holders of any series of Preferred Stock to elect directors, the precise number of directors shall be fixed exclusively pursuant to a resolution adopted by the Board of Directors. Vacancies and newly-created directorships shall be filled exclusively by vote of a majority of the directors then in office, even if less than a quorum, or by a sole remaining director, except that any vacancy created by the removal of a director by the stockholders for cause shall only be filled, in addition to any other vote otherwise required by law, by vote of a majority of the outstanding shares of Common Stock. No decrease in the number of directors constituting the Board of Directors shall shorten the term of any incumbent director. A director elected to fill a vacancy shall be elected for the unexpired term of his or her predecessor in office, and a director chosen to fill a position resulting from an increase in the number of directors shall hold office until the next election of

the class for which such director shall have been chosen, subject to the election and qualification of his or her successor and to his or her earlier death, resignation or removal.

(b) Classified Board of Directors. Subject to the special rights of the holders of any series of Preferred Stock to elect directors, the Board of Directors (other than those directors elected by the holders of any series of Preferred Stock) shall be classified into three classes: Class I; Class II; and Class III. Each class shall consist, as nearly as possible, of one-third of the total number of directors constituting the entire Board of Directors and the allocation of directors among the three classes shall be determined by the Board of Directors. The initial Class I Directors shall serve for a term expiring at the first annual meeting of stockholders of the Corporation following the filing of this Second Restated Certificate of Incorporation; the initial Class II Directors shall serve for a term expiring at the second annual meeting of stockholders following the filing of this Second Restated Certificate of Incorporation; and the initial Class III Directors shall serve for a term expiring at the third annual meeting of stockholders following the filing of this Second Restated Certificate of Incorporation. Each director in each class shall hold office until his or her successor is duly elected and qualified or until his or her earlier death, resignation or removal. At each annual meeting of stockholders beginning with the first annual meeting of stockholders following the filing of this Second Restated Certificate of Incorporation, the successors of the class of directors whose term expires at that meeting shall be elected to hold office for a term expiring at the annual meeting of stockholders to be held in the third year following the year of their election, with each director in each such class to hold office until his or her successor is duly elected and qualified or until his or her earlier death, resignation or removal. If the number of directors is changed, any increase or decrease shall be apportioned among the classes so as to maintain the number of directors in each class as nearly equal as possible and such apportionment shall be determined by the Board of Directors.

(c) Removal. Subject to the special rights of the holders of any series of Preferred Stock to elect directors, the directors of the Corporation may be removed only for cause by the affirmative vote of the holders of at least a majority of the voting power of the outstanding shares of capital stock of the Corporation entitled to vote generally in the election of directors, voting together as a single class, at a meeting of the stockholders called for that purpose.

ARTICLE VI -- LIMITATION OF DIRECTOR LIABILITY

To the fullest extent that the DGCL or any other law of the State of Delaware (as they exist on the date hereof or as they may hereafter be amended) permits the limitation or elimination of the liability of directors, no director of the Corporation shall be liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director. No amendment to, or modification or repeal of, this Article VI shall adversely affect any right or protection of a director of the Corporation existing hereunder with respect to any state of facts existing or act or omission occurring, or any cause of action, suit or claim that, but for this Article VI, would accrue or arise, prior to such amendment, modification or repeal. If the DGCL is amended after the Effective Time to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the DGCL, as so amended.

ARTICLE VII -- MEETINGS OF STOCKHOLDERS

(a) Special Meetings of Stockholders. Subject to any special rights of the holders of any series of Preferred Stock, and to the requirements of applicable law, special meetings of stockholders of the Corporation may be called only (i) by or at the direction of the chairman of the Board of Directors or (ii) by the Board of Directors pursuant to a written resolution adopted by a majority of the total number of directors which the Corporation would have if there were no vacancies. Any business transacted at any special meeting of stockholders shall be limited to matters relating to the purpose or purposes stated in the notice of meeting.

(b) Election of Directors by Written Ballot. Election of directors need not be by written ballot.

ARTICLE VIII -- AMENDMENTS TO THE BYLAWS AND CERTIFICATE OF INCORPORATION

(a) Bylaws. In furtherance and not in limitation of the powers conferred by law, the Board of Directors is expressly authorized to make, alter, amend or repeal the bylaws of the Corporation subject to the power of the stockholders of the Corporation entitled to vote with respect thereto to make, alter, amend or repeal the bylaws.

(b) Amendments to the Certificate of Incorporation. The Corporation reserves the right to amend, alter, change or repeal any provision contained in this Second Restated Certificate of Incorporation in the manner now or hereafter prescribed by the DGCL, and all rights conferred upon stockholders herein are granted subject to this reservation.

ARTICLE IX -- RENOUNCEMENT OF CORPORATE OPPORTUNITY

(a) Scope. The provisions of this Article IX are set forth to define, to the extent permitted by applicable law, the duties of Exempted Persons (as defined below) to the Corporation with respect to certain classes or categories of business opportunities. "Exempted Persons" means investment funds affiliated with CCMP Capital Advisors, LP and their respective successors, Transferees and Affiliates (other than the Corporation and its subsidiaries) (collectively, the "CCMP Entities") and INEOS Investments Partnership and its respective successors, Transferees and Affiliates (other than the Corporation and its subsidiaries) (collectively, the "INEOS Entities"), and all of their respective partners, principals, directors, officers, members, managers and/or employees, including any of the foregoing who serves as officer or director of the Corporation. "Affiliate" means, with respect to any Person, any other Person that directly, or indirectly through one or more intermediaries, controls, or is controlled by, or is under common control with, such Person; the term "control," as used in this definition, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise, and "controlled," "controlling" and "under common control" have meanings correlative to the foregoing. "Person" means an individual, any general partnership, limited partnership, limited liability company, corporation, trust, business trust, joint stock company, joint venture, unincorporated association, cooperative or association or any other legal entity or organization of whatever nature, and shall include any successor (by merger

or otherwise) of such entity. “Transferee” means any Person who (i) becomes a beneficial owner of Common Stock upon having acquired such shares of Common Stock, solely with respect to a Transferee of a CCMP Entity, from an investment fund affiliated with CCMP Capital Advisors, LP or, solely with respect to a Transferee of INEOS Investments Partnership, from INEOS Investments Partnership and (ii) is designated in writing by the transferor as a “Transferee” and a copy of such writing is provided to the Corporation at or prior to the time of such transfer; provided, however, that a purchaser of Common Stock in a registered offering or in a transaction effected pursuant to Rule 144 under the Securities Act of 1933, as amended (or any similar or successor provision thereto), shall not be a “Transferee.”

(b) Competition and Allocation of Corporate Opportunities. The Exempted Persons shall not have any fiduciary duty to refrain from engaging directly or indirectly in the same or similar business activities or lines of business as the Corporation or any of its subsidiaries. To the fullest extent permitted by applicable law, the Corporation, on behalf of itself and its subsidiaries, renounces any interest or expectancy of the Corporation and its subsidiaries in, or in being offered an opportunity to participate in, business opportunities that are from time to time available to the Exempted Persons, even if the opportunity is one that the Corporation or its subsidiaries might reasonably have pursued or had the ability or desire to pursue if granted the opportunity to do so, and each such Exempted Person shall have no duty to communicate or offer such business opportunity to the Corporation (and there shall be no restriction on the Exempted Persons using the general knowledge and understanding of the Corporation and the industry in which it operates which it has gained as an Exempted Person in considering and pursuing such opportunities or in making investment, voting, monitoring, governance or other decisions relating to other entities or securities) and, to the fullest extent permitted by applicable law, shall not be liable to the Corporation or any of its subsidiaries or stockholders for breach of any fiduciary or other duty, as a director or officer or otherwise, by reason of the fact that such Exempted Person pursues or acquires such business opportunity, directs such business opportunity to another person or fails to present such business opportunity, or information regarding such business opportunity, to the Corporation or its subsidiaries, or uses such knowledge and understanding in the manner described herein.

(c) Certain Matters Deemed Not Corporate Opportunities. In addition to and notwithstanding the foregoing provisions of this Article IX, a corporate opportunity shall not be deemed to belong to the Corporation if it is a business opportunity that the Corporation is not financially able or contractually permitted or legally able to undertake, or that is, from its nature, not in the line of the Corporation’s business or is of no practical advantage to it or that is one in which the Corporation has no interest or reasonable expectancy.

(d) Amendment of this Article. No amendment or repeal of this Article IX in accordance with the provisions of paragraph (b) of Article VIII shall apply to or have any effect on the liability or alleged liability of any Exempted Person for or with respect to any activities or opportunities of which such Exempted Person becomes aware prior to such amendment or repeal. This Article IX shall not limit any protections or defenses available to, or indemnification or advancement rights of, any director or officer of the Corporation under this Second Restated Certificate of Incorporation, the Corporation’s bylaws or applicable law.

ARTICLE X -- BUSINESS COMBINATIONS

(a) Opt Out of DGCL 203. The Corporation shall not be governed by Section 203 of the DGCL.

(b) Limitations on Business Combinations. Notwithstanding the foregoing, the Corporation shall not engage in any business combination (as defined below), at any point in time at which the Corporation's Common Stock is registered under Section 12(b) or Section 12(g) of the Exchange Act, with any interested stockholder (as defined below) for a period of three (3) years following the time that such stockholder became an interested stockholder, unless:

(i) prior to such time, the Board of Directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder,

(ii) upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least eighty-five percent (85%) of the voting stock (as defined below) of the Corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding (but not the outstanding voting stock owned by the interested stockholder) those shares owned by (i) persons who are directors and also officers or (ii) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer, or

(iii) at or subsequent to such time, the business combination is approved by the Board of Directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least two thirds of the outstanding voting stock of the Corporation which is not owned by the interested stockholder.

(c) Definitions. For purposes of this Article X, references to:

(i) "affiliate" means, with respect to any person, any other person that directly, or indirectly through one or more intermediaries, controls, or is controlled by, or is under common control with, such person.

(ii) "associate," when used to indicate a relationship with any person, means: (i) any corporation, partnership, unincorporated association or other entity of which such person is a director, officer or partner or is, directly or indirectly, the owner of twenty percent (20%) or more of any class of voting stock; (ii) any trust or other estate in which such person has at least a twenty percent (20%) beneficial interest or as to which such person serves as trustee or in a similar fiduciary capacity; and (iii) any relative or spouse of such person, or any relative of such spouse, who has the same residence as such person.

(iii) "business combination," when used in reference to the Corporation and any interested stockholder of the Corporation, means:

(1) any merger or consolidation of the Corporation or any direct or indirect majority-owned subsidiary of the Corporation (a) with the interested stockholder, or (b) with any other corporation, partnership, unincorporated association or other entity if the merger or consolidation is caused by the interested stockholder and as a result of such merger or consolidation paragraph (b) of this Article X is not applicable to the surviving entity;

(2) any sale, lease, exchange, mortgage, pledge, transfer or other disposition (in one transaction or a series of transactions), except proportionately as a stockholder of the Corporation, to or with the interested stockholder, whether as part of a dissolution or otherwise, of assets of the Corporation or of any direct or indirect majority-owned subsidiary of the Corporation which assets have an aggregate market value equal to ten percent (10%) or more of either the aggregate market value of all the assets of the Corporation determined on a consolidated basis or the aggregate market value of all the outstanding stock of the Corporation;

(3) any transaction which results in the issuance or transfer by the Corporation or by any direct or indirect majority-owned subsidiary of the Corporation of any stock of the Corporation or of such subsidiary to the interested stockholder, except: (a) pursuant to the exercise, exchange or conversion of securities exercisable for, exchangeable for or convertible into stock of the Corporation or any such subsidiary which securities were outstanding prior to the time that the interested stockholder became such; (b) pursuant to a merger under Section 251(g) of the DGCL; (c) pursuant to a dividend or distribution paid or made, or the exercise, exchange or conversion of securities exercisable for, exchangeable for or convertible into stock of the Corporation or any such subsidiary which security is distributed, pro rata to all holders of a class or series of stock of the Corporation subsequent to the time the interested stockholder became such; (d) pursuant to an exchange offer by the Corporation to purchase stock made on the same terms to all holders of said stock; or (e) any issuance or transfer of stock by the Corporation; provided, however, that in no case under items (c)-(e) of this subsection (3) shall there be an increase in the interested stockholder's proportionate share of the stock of any class or series of the Corporation or of the voting stock of the Corporation (except as a result of immaterial changes due to fractional share adjustments);

(4) any transaction involving the Corporation or any direct or indirect majority-owned subsidiary of the Corporation which has the effect, directly or indirectly, of increasing the proportionate share of the stock of any class or series, or securities convertible into the stock of any class or series, of the Corporation or of any such subsidiary which is owned by the interested stockholder, except as a result of immaterial changes due to fractional share adjustments or as a result of any purchase or redemption of any shares of stock not caused, directly or indirectly, by the interested stockholder; or

(5) any receipt by the interested stockholder of the benefit, directly or indirectly (except proportionately as a stockholder of the Corporation), of any loans, advances, guarantees, pledges, or other financial benefits (other than those expressly permitted in subsections (1)-(4) above) provided by or through the Corporation or any direct or indirect majority-owned subsidiary.

(iv) “control,” including the terms “controlled,” “controlling” and “under common control with”, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of a person, whether through the ownership of voting stock, by contract or otherwise. A person who is the record or beneficial owner of twenty percent (20%) or more of the outstanding voting stock of a person shall be presumed to have control of such person, in the absence of proof by a preponderance of the evidence to the contrary. Notwithstanding the foregoing, a presumption of control shall not apply where such person holds voting stock, in good faith and not for the purpose of circumventing this Article X, as an agent, bank, broker, nominee, custodian or trustee for one or more record or beneficial owners who do not individually or as a group have control of such person.

(v) “interested stockholder” means any person (other than the Corporation or any direct or indirect majority-owned subsidiary of the Corporation) that (i) is the owner of fifteen percent (15%) or more of the outstanding voting stock of the Corporation, or (ii) is an affiliate or associate of the Corporation and was the owner of fifteen percent (15%) or more of the outstanding voting stock of the Corporation at any time within the three (3) year period immediately prior to the date on which it is sought to be determined whether such person is an interested stockholder, and the affiliates and associates of such person; provided, however, that the term “interested stockholder” shall not include (a) the CCMP Entities, (b) the INEOS Entities, or (c) any person whose ownership of shares in excess of the fifteen percent (15%) limitation set forth herein is the result of any action taken solely by the Corporation; provided that such person specified in this clause (c) shall be an interested stockholder if thereafter such person acquires additional shares of voting stock of the Corporation, except as a result of further corporate action not caused, directly or indirectly, by such person. For the purpose of determining whether a person is an interested stockholder, the voting stock of the Corporation deemed to be outstanding shall include stock deemed to be owned by the person through application of the definition of “owner” below but shall not include any other unissued stock of the Corporation which may be issuable pursuant to any agreement, arrangement or understanding, or upon exercise of conversion rights, warrants or options, or otherwise.

(vi) “owner,” including the terms “own” and “owned,” when used with respect to any stock, means a person that individually or with or through any of its affiliates or associates:

(1) beneficially owns such stock, directly or indirectly; or

(2) has (a) the right to acquire such stock (whether such right is exercisable immediately or only after the passage of time) pursuant to any agreement, arrangement or understanding, or upon the exercise of conversion

rights, exchange rights, warrants or options, or otherwise; provided, however, that a person shall not be deemed the owner of stock tendered pursuant to a tender or exchange offer made by such person or any of such person's affiliates or associates until such tendered stock is accepted for purchase or exchange; or (b) the right to vote such stock pursuant to any agreement, arrangement or understanding; provided, however, that a person shall not be deemed the owner of any stock because of such person's right to vote such stock if the agreement, arrangement or understanding to vote such stock arises solely from a revocable proxy or consent given in response to a proxy or consent solicitation made to ten (10) or more persons; or

(3) has any agreement, arrangement or understanding for the purpose of acquiring, holding, voting (except voting pursuant to a revocable proxy or consent as described in item (b) of subsection (2) above), or disposing of such stock with any other person that beneficially owns, or whose affiliates or associates beneficially own, directly or indirectly, such stock.

(vii) "person" means any individual, general partnership, limited partnership, limited liability company, corporation, trust, business trust, joint stock company, joint venture, unincorporated association, cooperative or association or any other legal entity or organization of whatever nature, and shall include any successor (by merger or otherwise) of such entity.

(viii) "stock" means, with respect to any corporation, capital stock and, with respect to any other entity, any equity interest.

(ix) "voting stock" means stock of any class or series entitled to vote generally in the election of directors.

ARTICLE XI -- EXCLUSIVE JURISDICTION FOR CERTAIN ACTIONS

(a) Exclusive Forum. Unless the Board of Directors or one of its committees otherwise approves, in accordance with Section 141 of the DGCL, this Second Restated Certificate of Incorporation and the bylaws of the Corporation, the selection of an alternate forum, the Court of Chancery of the State of Delaware (or, if the Court of Chancery of the State of Delaware does not have jurisdiction, the Superior Court of the State of Delaware, or, if the Superior Court of the State of Delaware also does not have jurisdiction, the United States District Court for the District of Delaware) shall, to the fullest extent permitted by applicable law, be the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim of breach of a fiduciary duty owed by any director, officer, other employee or security holder of the Corporation to the Corporation or some or all of the Corporation's stockholders, or a claim for aiding and abetting any such breach, (iii) any action asserting a claim against the Corporation arising pursuant to any provision of the DGCL, this Second Restated Certificate of Incorporation or the bylaws of the Corporation, (iv) any action to interpret, apply, enforce or determine the validity of this Second Restated Certificate of Incorporation or the bylaws of the Corporation or (v) any action asserting a claim governed by the internal affairs doctrine (each, a "Covered Proceeding").

(b) Personal Jurisdiction. If any action the subject matter of which is a Covered Proceeding is filed in a court other than the Court of Chancery of the State of Delaware, or, where permitted in accordance with paragraph (a) above, the Superior Court of the State of Delaware or the United States District Court for the District of Delaware (each, a “Foreign Action”) in the name of any person or entity (a “Claiming Party”) without the prior approval of the Board of Directors or one of its committees in the manner described in paragraph (a) above, such Claiming Party shall be deemed to have consented to (i) the personal jurisdiction of the Court of Chancery of the State of Delaware, or, where applicable, the Superior Court of the State of Delaware and the United States District Court for the District of Delaware, in connection with any action brought in any such courts to enforce paragraph (a) above (an “Enforcement Action”) and (ii) having service of process made upon such Claiming Party in any such Enforcement Action by service upon such Claiming Party’s counsel in the Foreign Action as agent for such Claiming Party.

(c) Notice and Consent. Any person or entity purchasing or otherwise acquiring any interest in shares of capital stock of the Corporation shall be deemed to have notice of and consented to the provisions of this Article XI and waived any argument relating to the inconvenience of the forums referenced above in connection with any Covered Proceeding.

ARTICLE XII -- SEVERABILITY

If any provision or provisions of this Second Restated Certificate of Incorporation shall be held to be invalid, illegal or unenforceable as applied to any circumstance for any reason whatsoever: (i) the validity, legality and enforceability of such provisions in any other circumstance and of the remaining provisions of this Second Restated Certificate of Incorporation (including, without limitation, each portion of any paragraph of this Second Restated Certificate of Incorporation containing any such provision held to be invalid, illegal or unenforceable that is not itself held to be invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby and (ii) to the fullest extent possible, the provisions of this Second Restated Certificate of Incorporation (including, without limitation, each such portion of any paragraph of this Second Restated Certificate of Incorporation containing any such provision held to be invalid, illegal or unenforceable) shall be construed so as to permit the Corporation to protect its directors, officers, employees and agents from personal liability in respect of their good faith service to or for the benefit of the Corporation to the fullest extent permitted by law.

* * *

IN WITNESS WHEREOF, the undersigned has caused this Second Restated Certificate of Incorporation to be executed by the officer below this 28th day of September, 2017.

PQ GROUP HOLDINGS INC.

By: /s/ Joseph S. Koscinski
Name: Joseph S. Koscinski
Title: Vice President and Secretary

Signature Page to Second Restated Certificate of Incorporation

**CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO SECTION 302 OF THE
SARBANES-OXLEY ACT OF 2002**

I, James F. Gentilcore, certify that:

1. I have reviewed this quarterly report on Form 10-Q of PQ Group Holdings Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 13, 2017

/s/ JAMES F. GENTILCORE

James F. Gentilcore
Chief Executive Officer, President and Director
(Principal Executive Officer)

**CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF THE
SARBANES-OXLEY ACT OF 2002**

I, Michael Crews, certify that:

1. I have reviewed this quarterly report on Form 10-Q of PQ Group Holdings Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 13, 2017

/s/ MICHAEL CREWS

Michael Crews

Executive Vice President and Chief Financial Officer

(Principal Financial Officer)

**CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the quarterly report of PQ Group Holdings Inc. (the "Company") on Form 10-Q for the quarterly period ended September 30, 2017 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, James F. Gentilcore, Chief Executive Officer, President and Director of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934;
and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: November 13, 2017

/s/ JAMES F. GENTILCORE

James F. Gentilcore

Chief Executive Officer, President and Director

(Principal Executive Officer)

**CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the quarterly report of PQ Group Holdings Inc. (the "Company") on Form 10-Q for the quarterly period ended September 30, 2017 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Michael Crews, Executive Vice President and Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934;
and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: November 13, 2017

/s/ MICHAEL CREWS

Michael Crews

Executive Vice President and Chief Financial Officer

(Principal Financial Officer)