

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

AMENDMENT NO. 3
TO
FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

PQ GROUP HOLDINGS INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

2800
(Primary Standard Industrial
Classification Code Number)

81-3406833
(I.R.S. Employer
Identification Number)

**300 Lindenwood Drive
Valleybrooke Corporate Center
Malvern, Pennsylvania 19355
(610) 651-4400**

(Address, including zip code, and telephone number, including
area code, of registrant's principal executive offices)

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Approximate date of commencement of proposed sale to public: As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See 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 Accelerated filer
Non-accelerated filer (Do not check if a smaller reporting company) Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided to Section 7(a)(2)(B) of the Securities Act.

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	Proposed Maximum Aggregate Offering Price(1)(2)	Amount of Registration Fee(1)(3)
Common stock, par value \$0.01 per share	\$100,000,000	\$11,590

- (1) Estimated solely for the purpose of calculating the registration fee in accordance with Rule 457(o) of the Securities Act of 1933, as amended, based upon an estimate of the maximum offering price.
(2) Includes the offering price of additional shares of common stock that may be purchased by the underwriters.
(3) Previously paid.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

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The information in this preliminary prospectus is not complete and may be changed. These securities may not be sold until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities nor does it seek an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

Subject to Completion, dated September 1, 2017
PROSPECTUS



PQ Group Holdings Inc.

Common Stock

This is the initial public offering of the common stock of PQ Group Holdings Inc., a Delaware corporation. PQ Group Holdings Inc. is offering _____ shares of common stock to be sold in the offering.

Prior to this offering, there has been no public market for our common stock. The initial public offering price is expected to be between \$ _____ and \$ _____ per share. We have applied to list our common stock on the New York Stock Exchange under the symbol "PQG."

See "[Risk Factors](#)" beginning on page 27 to read about factors you should consider before buying shares of our common stock.

	<u>Per Share</u>	<u>Total</u>
Initial public offering price	\$ _____	\$ _____
Underwriting discounts and commissions (1)	\$ _____	\$ _____
Proceeds, before expenses, to us	\$ _____	\$ _____

(1) See "Underwriters" for additional information regarding underwriter compensation.

To the extent that the underwriters sell more than _____ shares of our common stock, the underwriters have the option for a period of 30 days from the date of this prospectus to purchase up to an additional _____ shares of our common stock from us at the initial public offering price less the underwriting discount.

Neither the Securities and Exchange Commission nor any other regulatory body has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

The underwriters expect to deliver the shares of our common stock on or about _____, 2017.

Morgan Stanley
J.P. Morgan

Goldman Sachs & Co. LLC
Jefferies
Deutsche Bank Securities
Evercore ISI

Citigroup

Credit Suisse
KeyBanc Capital Markets

Nomura

, 2017



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We have not authorized any person to provide you with any information or represent anything about us or this offering that is not contained in this prospectus or in any free writing prospectus we have prepared. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. This prospectus is an offer to sell only the shares offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. The information contained in this prospectus is current only as of its date.

SUPPLY SHARE AND INDUSTRY INFORMATION

Certain statistical information used throughout this prospectus is based on independent industry publications, reports by research firms or other published independent sources. Some statistical information is also based on our good faith estimates, which are derived from management's knowledge of our industry and such independent sources referred to above. Certain supply share statistics, ranking and industry information included in this prospectus, including the size of certain markets and our estimated supply share position and the supply share positions of our competitors, are based on management estimates. These estimates have been derived from our management's knowledge and experience in the industry and end uses into which we sell our products, as well as information obtained from surveys, reports by research firms, our customers, distributors, suppliers, trade and business organizations and other contacts in the industries into which we sell our products. We believe these data to be accurate as of the date of this prospectus. However, this information may prove to be inaccurate because this information cannot always be verified with complete certainty due to the limitations on the availability and reliability of raw data, the voluntary nature of the data gathering process and other limitations and uncertainties. Unless otherwise noted, all of our supply share position information presented in this prospectus is an approximation based on management's knowledge and is based on our, or, in the case of our zeolite catalysts product group, our Zeolite Joint Venture's, sales volumes relative to the estimated sales volumes for the year ended December 31, 2016 in relevant products or end uses into which we sell our products. In the case of our refining services product group, including the products and services thereof, such supply share position information excludes volume attributable to manufacturers who produce primarily for their own consumption. References to our being a leader in a supply share position or product group refer to our belief that we have one of the leading supply share positions, unless otherwise indicated or the context otherwise requires. In addition, references to various end uses into which we sell our products are based on how we define the end uses for our products.

Certain monetary amounts, percentages and other figures included in this prospectus have been subject to rounding adjustments. Accordingly, numerical figures shown as totals in certain tables or charts may not be the arithmetic aggregation of the figures that precede them. In addition, we round certain percentages presented in this prospectus to the nearest whole number. As a result, figures expressed as percentages in the text may not total 100% or, as applicable, when aggregated may not be the arithmetic aggregation of the percentages that precede them.

TRADEMARKS AND TRADENAMES

We own or have rights to trademarks or trade names that we use in conjunction with the operation of our business. In addition, our name, logo and website name and address are our service marks or trademarks. Each trademark, trade name or service mark by any other company appearing in this prospectus belongs to its holder. Some of the more important trade names and trademarks that we use include Potters, PQ, Zeolyst, Zeolyst International and EcoServices. We also own or have the rights to copyrights that protect the content of our products. Solely for convenience, the trademarks, service marks, trade names and copyrights referred to in this prospectus are listed without the TM, SM, [®] and [©] symbols, but we will assert, to the fullest extent under applicable law, our rights to these trademarks, service marks, trade names and copyrights.

THE BUSINESS COMBINATION

On May 4, 2016, we consummated a series of transactions (the "Business Combination") to reorganize and combine the businesses of PQ Holdings Inc. ("PQ Holdings") and Eco Services Operations LLC ("Eco") under a new holding company, PQ Group Holdings Inc. ("PQ Group Holdings" or the "company"), pursuant to a reorganization and transaction agreement, dated August 17, 2015, as amended, by and among PQ Group Holdings, PQ Holdings, PQ Corporation, Eco, Eco Services Holdings LLC, Eco Services Group Holdings LLC and certain investment funds affiliated with CCMP Capital Advisors, LLC (now known as CCMP Capital Advisors, LP; "CCMP"). 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."

BASIS OF FINANCIAL PRESENTATION

Legacy Eco operated as a business unit of Solvay USA Inc. (“Solvay”) until the acquisition of substantially all of the assets of Solvay’s Eco Services business unit by Eco on December 1, 2014 (the “2014 Acquisition”). References in this prospectus to “Predecessor” include each of the periods from January 1, 2012 to November 30, 2014. For 2014, the results include 11 months of legacy Eco operating activity (January 1, 2014 to November 30, 2014) and include amounts that have been “carved out” from Solvay’s financial statements using assumptions and allocations made by Solvay to reflect Solvay’s Eco Services business unit on a stand-alone basis. References in this prospectus to “Successor” refer to the period from inception of Eco (July 30, 2014) to December 31, 2014, but only include one month of legacy Eco operating activity (December 1, 2014 to December 31, 2014), because there was no operating activity for the period from inception (July 30, 2014) to November 30, 2014, and reflect legacy Eco on a stand-alone basis.

On May 4, 2016, we consummated the Business Combination to reorganize and combine the businesses of PQ Holdings and Eco under a new holding company. In accordance with United States generally accepted accounting principles (“GAAP”), legacy Eco was the accounting acquirer in the Business Combination and, as such, legacy Eco is treated as our predecessor and therefore the financial information through May 3, 2016 only includes the results of legacy Eco. The financial information presented in this prospectus subsequent to May 3, 2016 is of PQ Group Holdings, which includes the operating results of legacy Eco and legacy PQ.

The following table summarizes, for each of the periods specified below and for which financial information is included for the issuer, PQ Group Holdings, in this prospectus, 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.

	Six months ended June 30,		Pro forma year ended December 31, 2016	Years ended December 31,		Successor	Predecessor
	2017	2016		2016	2015	Period from inception (July 30, 2014) to December 31, 2014	Period from January 1, 2014 to November 30, 2014
Operations of legacy Eco	Included	Included	Included	Included	Included	Partially included (December 1 to December 31)	Included (January 1 to November 30)
Operations of legacy PQ	Included	Partially included (May 4 to June 30)	Included	Partially included (May 4 to December 31)	Not included	Not included	Not included

The financial statements of our accounting predecessor contained in this prospectus for periods prior to the 2014 Acquisition are not necessarily indicative of what legacy Eco’s financial position, results of operations and cash flows would have been had legacy Eco operated as a separate, standalone entity independent of Solvay.

Additional information regarding our financial performance and non-GAAP measures, including reconciliations of non-GAAP measures to their most directly comparable GAAP measure, is included in “Summary Historical and Unaudited Pro Forma Financial and Other Data.” In addition, such financial information should be read in conjunction with the disclosures set forth under “Unaudited Pro Forma Financial Information of PQ Group Holdings” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and related notes appearing elsewhere in this prospectus.

THE RECLASSIFICATION

In connection with this offering, on _____, 2017, we reclassified our Class A common stock into common stock and then effected a _____-for-1 split of our common stock. Immediately prior to this offering, we will convert each outstanding share of our Class B common stock into approximately _____ shares of our common stock plus an additional number of shares determined by dividing the unreturned paid-in capital amount of such share of Class B common stock, or \$ _____ per share, by the initial public offering price of a share of our common stock in this offering, rounded to the nearest whole share. Holders of our Class B common stock will not receive any cash payments from us in connection with the conversion of the Class B common stock. References to the “Reclassification” throughout this prospectus refer to the reclassification of our Class A common stock into our common stock, the _____-for-1 split of our common stock and the conversion of our Class B common stock into our common stock. Unless otherwise indicated, all share data gives effect to the Reclassification, including the conversion of all shares of our Class B common stock into shares of our common stock, based upon an estimated Class B conversion factor determined by reference to an assumed initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus. Such share data is subject to change based on the actual number of shares of our common stock issued in connection with the conversion of our Class B common stock into our common stock. See “The Reclassification.”

PROSPECTUS SUMMARY

This summary highlights information appearing elsewhere in this prospectus. This summary is not complete and does not contain all of the information that you should consider before investing in our common stock. You should carefully read the entire prospectus, including the historical financial statements and related notes and the pro forma financial information and related notes included elsewhere in this prospectus and the sections entitled "Risk Factors" and "Cautionary Note Regarding Forward-Looking Statements," before deciding whether to invest in our common stock. Unless otherwise indicated or the context otherwise requires, references to "we," "us," "our," "PQ Group Holdings," or the "company" refer to PQ Group Holdings Inc. and its consolidated subsidiaries, including PQ Holdings Inc., Eco Services Operations Corp. and PQ Corporation, our primary operating company. We refer to the business of PQ Holdings Inc. prior to the Business Combination as "legacy PQ" and we refer to the business of Eco Services Operations LLC prior to the Business Combination as "legacy Eco." See "Basis of Financial Presentation." All information in this prospectus assumes no exercise of the underwriters' option to purchase additional shares, unless otherwise noted.

Our Company

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 believe our products deliver significant value to our customers, as demonstrated by our profit margins. Our products, which are mostly additives, catalysts, and services, typically constitute a small portion of our customers' overall end-product costs yet are critical to product performance. For example, our catalysts are highly technical, customized products that require customer collaboration and significant lead time, resources, and intellectual property to develop. Through this collaborative innovation process, we have developed zeolite-based catalysts that are an effective and efficient method to reduce pollutants in diesel engines and enable our customers to meet increasingly stringent vehicle emission standards worldwide. In personal care applications, we have collaborated with leading consumer products companies over a number of years to develop a family of gentle silica-based dentifrice abrasives that produce more effective cleaning toothpastes. These collaborative efforts with our customers continue to drive our product innovation process.

Our value-added products seek to address global issues that are often either the subject of significant regulations or are driven by consumer preferences, which we believe positions us to grow in excess of gross domestic product growth rates. Consumer preferences and global regulations requiring environmentally friendlier products are at the core of many of our value-added products and, we believe, provide us with high-margin growth opportunities. For example, our products and services facilitate improvement in vehicle fuel efficiency and emissions, enable vehicles to be lighter, and allow tires to roll and engines to run with less friction. The production of higher octane gasoline, which is needed for certain smaller turbocharged engines, has generated additional demand for the alkylation units that use our refinery services.

For the year ended December 31, 2016, we generated sales of \$1,064.2 million and pro forma sales of \$1,403.0 million, a net loss of \$(79.7) million and a pro forma net loss of \$(57.7) million, and pro forma Adjusted EBITDA of \$420.8 million, which represented a pro forma Adjusted EBITDA margin of approximately 30%. In addition, our zeolite catalysts product group operates through Zeolyst International and Zeolyst C.V. (our 50% owned joint ventures that we refer to collectively as our "Zeolyst Joint Venture"). For the year ended December 31, 2016, 50% of the total net sales of our Zeolyst Joint Venture totaled \$131.3 million. Additional information regarding our financial performance and non-GAAP measures, including pro forma Adjusted EBITDA, together with a reconciliation of non-GAAP measures to their most directly comparable GAAP measure, is included in "Summary Historical and Unaudited Pro Forma Financial and Other Data." See footnote (4) to "Summary Historical and Unaudited Pro Forma Financial and Other Data" for a description of the treatment of our Zeolyst Joint Venture in our consolidated financial information.

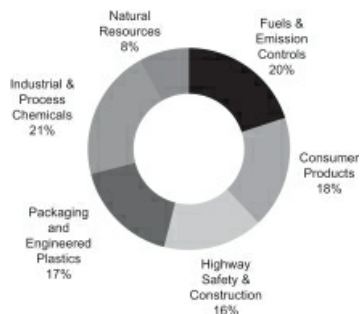
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We have two reporting segments: environmental catalysts and services and performance materials and chemicals. In our environmental catalysts and services segment, we have three product groups: silica catalysts, zeolite catalysts, and refining services. In our performance materials and chemicals segment, we have two product groups: performance materials and performance chemicals.

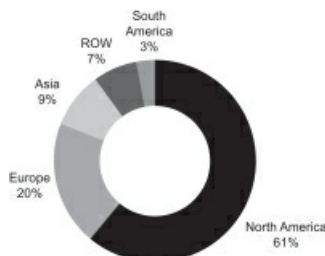
In 2016, we served over 4,000 customers globally across many end uses and, as of June 30, 2017, operated out of 72 manufacturing facilities, which are strategically located across six continents. We believe we are a leader in each of our product groups, holding what we estimate to be a number one or number two supply share position for products that generated more than 90% of our 2016 pro forma sales. We believe that our global footprint and efficient network of strategically located manufacturing facilities provide us with a strong competitive advantage in serving our customers. We serve these customers both regionally as well as globally. We believe that we hold our leading supply share positions in the key regions that we serve while also benefiting from leading global presence and capabilities. Within our performance chemicals product group, we estimate that we had approximately three times the sodium silicate supply share of our closest competitor based on 2016 sales volume. This product group, which is the backbone across our additives and catalyst platform, is highly regionalized because of the expense of shipping sodium silicates extended distances due to their water content. Our refining services product group is also a highly regionalized business due to shipping costs and customer integration requirements, and in 2016 we estimate that we had a regenerated sulfuric acid supply share in excess of 50% in the United States, which we believe is substantially larger than our closest competitor. We recently reorganized our business to be market-based rather than product-based in order to better align our product groups with similar end uses to meet our customers' needs.

We are highly diversified by business, geography, and end use, and in 2016 the majority of our pro forma sales were into applications that have historically had relatively predictable, consistent demand patterns driven by consumption or frequent replacement cycles.

**2016 Pro Forma Sales and Zeolyst Joint Venture
Total Net Sales by End Use (1)(2)**



**2016 Pro Forma Sales and Zeolyst Joint Venture
Total Net Sales by Geography (1)(2)(3)**



- (1) Pro forma information gives effect to the consummation of the Business Combination and the related financing transactions as if they occurred on January 1, 2015.
- (2) Percentage calculations include \$131.3 million of total net sales attributable to our Zeolyst Joint Venture, which represents 50% of its total net sales for the year ended December 31, 2016. See footnote (4) to "Summary Historical and Unaudited Pro Forma Financial and Other Data" for a description of the treatment of our Zeolyst Joint Venture in our consolidated financial information.
- (3) Based on the delivery destination for products sold in 2016.

Our 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, customers demand consistent product quality and a reliable source of supply. Products sold to our customers can be highly value-added even when they represent only a small portion of the overall end product costs, and success can be achieved by helping customers improve their product performance, value, and quality. As a result, operating margins in this sector have historically been high and generally stable through economic cycles. 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. The combination of attractive operating margins and moderate and generally predictable maintenance capital expenditure requirements can produce attractive cash flows. Our industry is also characterized by the need to produce consistent quality in a safe and environmentally sustainable manner.

The table below summarizes our key end use applications and products as well as the significant growth drivers in those applications.

Key End Uses	2016 Pro Forma Sales and Zeolyst Joint Venture Total Net Sales(1)(2)	Significant Growth Drivers	Key PQ Products
Fuels & Emissions Controls	20%	<ul style="list-style-type: none"> • Global regulatory requirements to: <ul style="list-style-type: none"> • Remove nitrogen oxides from emissions • Remove sulfur from diesel and gasoline • Increase gasoline octane in order to improve fuel efficiency while lowering vapor pressure to regulated levels for premium fuels • Improve lubricant characteristics to improve fuel efficiencies 	<ul style="list-style-type: none"> • Refinery catalysts • Emissions control catalysts • Catalyst recycling services
Consumer Products	18%	<ul style="list-style-type: none"> • Substitution of silicate materials for less environmentally friendly chemical additives in detergent and cleaning end uses • Demand for improved quality and shelf life of beverages • Demand for improved oral hygiene and appearance 	<ul style="list-style-type: none"> • Silica gels for edible oil and beer clarification • Precipitated silicas and zeolites for the surface coating, dentifrice, and dishwasher and laundry detergent applications
Highway Safety & Construction	16%	<ul style="list-style-type: none"> • Demand for enhanced “dry and wet” visibility of road and airport markings to improve safety • Drive for weight reduction in cements 	<ul style="list-style-type: none"> • Reflective markings for roadways and airports • Hollow glass beads, or microspheres, for cement additives

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Key End Uses	2016 Pro Forma Sales and Zeolyst Joint Venture Total Net Sales(1)(2)	Significant Growth Drivers	Key PQ Products
Packaging & Engineered Plastics	17%	<ul style="list-style-type: none"> • Demand for increased process efficiency and reduction of by-products in production of chemicals • Demand for high-density polyethylene lightweighting of automotive components • Enhanced properties in plastic composites for the automotive and electronics industries 	<ul style="list-style-type: none"> • Catalysts for high-density polyethylene and chemicals syntheses • Antiblocks for film packaging • Solid and hollow microspheres for composite plastics
Industrial & Process Chemicals	21%	<ul style="list-style-type: none"> • Demand in the tire industry for reduced rolling resistance • Usage of silicate in municipal water treatment to inhibit corrosion in aging pipelines • Growth in manufacturing in North America driving demand for metal finishing 	<ul style="list-style-type: none"> • Silicate precursors for the tire industry • Silicate for water treatment • Glass beads, or microspheres, for metal finishing end uses
Natural Resources	8%	<ul style="list-style-type: none"> • More environmentally friendly drilling fluids for oil and gas production • Recovery in global oil drilling / U.S. copper production • Growing demand for lighter weight cements in oil and natural gas wells 	<ul style="list-style-type: none"> • Silicates for drilling muds • Hollow glass beads, or microspheres, for oil well cements • Sulfur derivatives for copper mining • Bleaching aids for paper

(1) Pro forma information gives effect to the consummation of the Business Combination and the related financing transactions as if they occurred on January 1, 2015.
 (2) Percentage calculations include \$131.3 million of total net sales attributable to our Zeolyst Joint Venture, which represents 50% of its total net sales for the year ended December 31, 2016. See footnote (4) to “Summary Historical and Unaudited Pro Forma Financial and Other Data” for a description of the treatment of our Zeolyst Joint Venture in our consolidated financial information.

Our Business

The table below summarizes certain information regarding our two reporting segments and our five product groups for the year ended December 31, 2016.

(Dollars in millions) Segments and Product Groups	Year ended December 31, 2016								Estimated Supply Share Position ⁽⁵⁾
	Sales	% of Total Sales	Pro Forma Sales ⁽¹⁾	Zeolyst Joint Venture Total Net Sales ⁽²⁾	% of Total Pro Forma Sales and Zeolyst Joint Venture Total Net Sales ^{(1) (2)(3)}	Net Loss	Pro Forma Adjusted EBITDA ⁽¹⁾⁽²⁾	% of Total Pro Forma Adjusted EBITDA ^{(1) (2)(4)}	
Environmental Catalysts and Services:									
Silica Catalysts	\$ 53.0	5.0%	\$ 84.2	\$ —	5.5%				#2
Zeolite Catalysts	—	—	—	131.3	8.5%				Primarily #1 or #2
Refining Services	373.7	35.0%	373.7	—	24.3%				#1
Subtotal	\$ 426.7	40.0%	\$ 457.9	\$131.3	38.3%		\$ 221.8	48.9%	
Performance Materials and Chemicals:									
Performance Chemicals	\$ 437.5	41.0%	\$ 663.9	\$ —	43.2%				Primarily #1 ⁽⁶⁾
Performance Materials	206.5	19.4%	291.3	—	19.0%				Primarily #1 ⁽⁷⁾
Sales Eliminations	(5.0)	(0.4%)	(8.0)	—	(0.5%)				
Subtotal	\$ 639.0	60.0%	\$ 947.2	\$ —	61.7%		\$ 231.8	51.1%	
Eliminations / Corporate	(1.5)		(2.1)	—			(32.8)		
Total	\$1,064.2	100.0%	\$1,403.0	\$131.3	100.0%	\$(79.7)	\$ 420.8	100.0%	

- (1) Pro forma information gives effect to the consummation of the Business Combination and the related financing transactions as if they occurred on January 1, 2015.
- (2) Percentage calculations include \$131.3 million of total net sales attributable to our Zeolyst Joint Venture, which represents 50% of its total net sales for the year ended December 31, 2016. See footnote (4) to “Summary Historical and Unaudited Pro Forma Financial and Other Data” for a description of the treatment of our Zeolyst Joint Venture in our consolidated financial information.
- (3) Percentage calculations exclude \$2.1 million in intersegment sales eliminations.
- (4) Percentage calculations exclude \$32.8 million in corporate expenses.
- (5) Estimated supply share positions are based on management’s estimates based on 2016 sales volume and represent our estimated global supply share positions for each of our product groups, except that the estimated supply share position for our refining services product group reflects our estimate of only our supply share position in the United States and excludes volume attributable to manufacturers who produce primarily for their own consumption.
- (6) We believe we hold #1 supply share positions with respect to products that accounted for approximately 73% of our performance chemicals product group’s 2016 pro forma sales, and that we hold #2 supply share positions with respect to products that accounted for the remaining approximately 27% of our performance chemicals product group’s 2016 pro forma sales.
- (7) We believe we hold #1 supply share positions with respect to products that accounted for approximately 89% of our performance materials product group’s 2016 pro forma sales, and that we hold #2 supply share positions with respect to products that accounted for the remaining approximately 11% of our performance materials product group’s 2016 pro forma sales.

We are an integrated, global provider of catalysts, specialty materials and chemicals, and services that share common end uses, manufacturing techniques, and process technology. For example, all of our product groups address challenges faced by global automotive companies to meet increasingly strict fuel efficiency standards. Our manufacturing platform is based on furnace technology and proprietary knowledge developed from almost

two centuries of combined experience at legacy PQ and legacy Eco applying silicates chemistry production and the development of applications across a broadening set of end uses. All of our product groups produce materials through our furnace process, other than our silica catalysts and zeolite catalysts product groups, which are derivatives of our performance chemicals product group. We believe we have a differentiated capability around furnace operations that enables us to operate more efficiently than most of our competitors.

Environmental Catalysts and Services

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 catalysts are highly technical and customized for our customers and can require up to ten years of development and collaboration with customers in order to commercialize. Catalyst specifications are constantly evolving in order to address changing customer demands and requirements for lower cost and improved quality. As a result, we must continuously collaborate with our customers to create new and more efficient pathways for the production of chemicals and fuels. Our environmental catalysts and services business consists of three product groups: silica catalysts, zeolite catalysts, and refining services.

Silica Catalysts. In our silica catalysts product group, we sell both the finished catalyst and catalyst supports, which are critical catalyst components, for the production of high-density polyethylene (“HDPE”), a high strength and high stiffness plastic used in packaging films, bottles and containers, and other molded applications. We also produce a catalyst that is used globally for the production of methyl methacrylate, the monomer for acrylic engineering resins, a clear scratch-resistant plastic used in sheet or molded form to replace glass and as a durable surface coating.

Zeolite Catalysts. Our zeolite catalysts product group is a leading global supplier of emissions control catalysts as well as a supplier of specialty catalysts, precursors, and formulations to refineries and downstream petrochemicals and chemical companies. We operate through our Zeolyst Joint Venture with CRI Zeolites Inc., which is an affiliate of Royal Dutch Shell (“CRI”). Our Zeolyst Joint Venture is a long-standing partnership dating back to 1988, which combines our expertise in zeolites supply and technology and our partner’s expertise in global refinery catalyst sales and technology. These specialty zeolite-based catalysts are sold to the emissions control industry for use in diesel emission control units in both on-road and non-road diesel engines. In addition, our zeolite catalysts product group is a leading supplier of hydrocracking catalysts as a direct seller and supplier to other catalyst suppliers. This product group also produces other specialty catalysts, including aromatic catalysts that upgrade aromatic by-product streams, dewaxing catalysts that improve lube oil performance and diesel cold flow performance, and paraffin isomerization catalysts that upgrade olefins to high octane gasoline blending components, for refinery and petrochemical customers. From 2015 to 2020, global heavy- and light-duty diesel vehicle production is expected to grow at a compound annual growth rate of 4.1% and 2.8%, respectively. We believe that this estimated vehicle production growth combined with the continuing evolution of governmental regulation and product innovation involving emissions control will afford us with opportunities for growth in our zeolite catalysts product group.

Refining Services. Sulfuric acid is the primary catalyst used in the production of alkylates for gasoline production at refineries. Alkylates are a critical additive that increase octane in gasoline at low vapor pressure, and currently are used in most gasoline in the United States. Alkylate demand is expected to grow because its benefits are needed in certain smaller turbocharged engines to meet increasingly stringent fuel efficiency standards. The number of these turbocharged light-duty vehicles in the United States is expected to make up approximately 83% of all light-duty vehicles by 2025, a significant increase from approximately 18% in 2014, which we believe will increase the demand for higher-octane gasoline. Premium gasoline production grew at a

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compound annual growth rate of 6.1% between 2011 and 2016 according to the United States Energy Information Administration. Our refining services product group provides recycling and end-to-end logistics for refiners who use sulfuric acid in their alkylation units. These recycling units also produce virgin sulfuric acid and sodium bisulfate, which we sell into the water treatment, mining, and general industrial and chemicals industries.

We estimate that we hold the number one supply share position in the United States for these sulfuric acid recycling services based upon our 2016 sales volume. Our refining services product group is highly regionalized due to shipping costs and customer integration requirements. Our facilities are located near or, in some cases, within our customers' refineries and our products are often supplied directly to our customers by pipeline. In addition, product can be shipped by barge, rail, and truck. As a result, we believe that our integrated and strategically located network of facilities and end-to-end logistics assets in the United States provides us with a significant competitive advantage and would be costly for our competitors to replicate.

Performance Materials and Chemicals

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 products. 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. We believe that our global footprint enables us to compete more effectively on a global basis due to the costs associated with shipping these products over extended distances and that our network of strategically located manufacturing facilities allows us to serve our customers at a lower cost than our competitors and with quicker delivery times for our products. Our performance materials are also being used in some cases as a substitute for less environmentally friendly materials. For example, specialty silicates are displacing phosphates in dish detergents, precipitated silicas are displacing carbon black in tires, and hollow and solid microspheres are displacing plastic volumes in transportation lightweighting applications. Our performance materials and chemicals business consists of two product groups: performance chemicals and performance materials.

Performance Chemicals. Our performance chemicals product group includes silicate products and derivatives, which are used in a variety of applications such as adsorbents for surface coatings, clarifying agents for edible oils and beverages, precursors for green tires, and additives for cleaning and personal care products. Silicates are a family of products manufactured primarily from readily available materials, such as industrial sand and soda ash. These raw materials are typically fused in a furnace and then dissolved in water under pressure to form water-soluble silicates for use in our downstream products, such as precipitated silica and silica gels. We sell our performance chemicals products to customers who use silicates as precursors, such as sodium silicates that are used in the growing precipitated silica applications, as well as for downstream derivative products, such as silicas used as additives in toothpaste formulation and silica gels that are used as adsorbents in food and beverage manufacturing. Our network of regional silicate plants is strategically located to support the customers that we serve. In addition, we maintain a few larger dedicated facilities to service our derivative products. Our performance chemicals product technology requires significant know-how and scale in order to be able to operate in a cost effective manner. We believe that we are the only global silicates producer who can supply all of the major regions, and we estimate that we have three times the sodium silicates supply share as our nearest competitor based on 2016 sales volume. Key end uses for our performance chemicals products include catalyst precursors, food and beverage, personal care, cleaning products, coatings, tires, soil stabilization, paper de-inking, and sequestration. According to Notch Consulting, global demand for precipitated silica is estimated to grow at a compound annual growth rate of 5.8% between 2015 and 2020, driven primarily by expected increases in demand from tires, footwear and other rubber applications.

Performance Materials. Our performance materials product group includes specialty glass products, such as highly engineered microspheres made from either recycled glass or fresh batch material using our proprietary furnace operations. We believe that we are an industry leader in North America, Europe, South America, and Asia (excluding China) in microspheres. These products are used in the reflective markings used on roads and runways to enhance visibility at night and in poor weather to improve safety. Our microspheres, which can be solid or hollow, are also used as additives in plastics for lightweighting and as abrasive media, where they are used to clean, peen, and debur metal surfaces, such as for turbine blades used in aerospace and power generation industries.

Our Competitive Strengths

Leading Global and Regional Positions in Attractive End Uses

We believe that we maintain a leading supply position in each of our major product groups, holding what we estimate to be the number one or two supply share position in 2016 for products that generated more than 90% of our pro forma sales. We believe that our global footprint and efficient network of strategically located manufacturing facilities provides us with a strong competitive advantage in serving our customers both globally and regionally, and that it would be costly for our competitors to replicate our network.

In our environmental catalysts and services business, we primarily compete on a global basis, with the exception of our refining services product group, where we compete on a more regional basis due to the costs associated with shipping these products over extended distances. We are a leading supplier of refinery hydrocracking catalysts and emissions control catalysts that are used in the heavy- and light-duty diesel industries to reduce nitrogen oxides emissions. We are also a global leader in specialty catalysts, such as catalysts for methyl methacrylate and for lube oil and diesel fuel dewaxing. In these applications, we primarily compete with other global producers such as W.R. Grace, BASF, UOP, and Albemarle, as well as other niche competitors such as Tosoh, Axens, and Haldor Topsoe.

In our refining services product group, we compete in a number of regions where our facilities are required to be close to our refinery customers, and in some cases located within the refinery with a direct pipeline to deliver our product. We estimate that our refining services product group holds the number one supply share position in the United States in sulfuric acid regeneration based on 2016 sales volume with an estimated 53% supply share. We also estimate that we had a 64% supply share in each of the West Coast and Gulf Coast areas based on 2016 sales volume, which we believe was greater than three times the supply share of our largest competitor. In our performance chemicals product group, where we also compete primarily on a regional basis due to the costs associated with shipping sodium silicates, we estimate that we had approximately three times the sodium silicates supply share of our nearest competitor based on 2016 sales volume. We believe that we are the only global silicates producer with operations in North America, Europe, and Australia. We believe that we have technical, cost, and proximity advantages in all of these regions as compared to our competitors as a result of the scale and breadth of our product offerings and operations.

These leadership positions serve industries that are attractive due to the need for customized and innovative products, stability of demand, and growth potential driven by the regulatory environment and consumer preferences. Our products generally require close customer collaboration to address end use challenges that are constantly evolving. We produce value-added products that are critical to the performance characteristics of our customers' products. In addition, in 2016, a majority of our pro forma sales were to end uses such as fuels and emission controls, consumer products, and highway safety and construction that generally do not exhibit as pronounced cyclicality as other applications. Further, many of these end uses are growing due to increased global regulations, such as regulations regarding sulfur content in transportation fuel and particulate matter and nitrogen

oxides emissions from on-road and non-road diesel engines. Increasingly stringent automotive fuel efficiency standards are also expected to lead to an increase in the demand for higher-octane gasoline. While we believe increasing regulatory standards provide attractive growth opportunities, we may be required to develop new products in response to such regulations in order to fully capture such opportunities. In addition, our products are ingredients in consumer products, which includes personal care and consumer cleaning products, where customers are seeking more environmentally friendly products without loss of effectiveness or performance. We believe that our products have the environmental and safety profile to address these evolving customer demands.

Long-Term, High-Quality Customer Relationships and Innovation Track Record

Many of our products require close customer collaboration to address application challenges that are constantly evolving. As a result, we work with our customers over many years in order to develop products to meet customized specifications and performance characteristics while also maintaining strict quality standards. While we are unable to predict future shifts in customer demand, the long lead-time required for product development and commercialization, which can be up to ten years in our environmental catalysts and services business, provides the opportunity for us to build long-term relationships with customers.

We collaborate with leading multinational companies that often seek global solutions. Our customers include large industrial companies such as BASF, Honeywell, and 3M, and global catalyst producers such as Albemarle and W.R. Grace. We also supply catalysts to leading chemical and petrochemical producers such as BASF, Dow Chemical, Lucite, LyondellBasell, and Shell. We supply personal care ingredients and additives to leading consumer products companies such as Unilever and Colgate-Palmolive. We have long-term relationships with our top ten customers, based on 2016 pro forma sales, that average more than 50 years. In addition, our customer base is diversified, with our top ten customers in 2016 representing approximately 24% of our pro forma sales for the year ended December 31, 2016 and no customer representing more than 4% of our pro forma sales during this period. However, the percentage of our sales generated by our top customers may increase in the future as a result of changes in industry dynamics, shifts in customer demands and contracts or other factors.

These long-term relationships have allowed us to innovate together with our customers to meet evolving demands. For example, we have developed zeolite-based catalysts that are an effective and efficient method to reduce pollutants from heavy- and light-duty diesel engines and enable our customers to meet increasingly stringent vehicle emission standards worldwide. In personal care applications, we have collaborated with leading consumer products companies over a number of years to develop a family of gentle silica-based dentifrice abrasives that produce more effective cleaning toothpastes. In addition, our proprietary silica catalyst has enabled development of a high strength HDPE resin that is used for making lightweight plastic gasoline tanks for automobiles. While we believe we are well positioned to capitalize on future innovation opportunities, the constantly evolving needs of our customers make it difficult to predict the pace or scope of future innovation opportunities.

Attractive and Stable Margins and Cash Flow

We have demonstrated the ability to maintain stable margins while continuing to grow our business in different macroeconomic environments. Our Adjusted EBITDA margins have averaged approximately 28% between 2012 and 2016. We believe that the stability of our margins and cash flows during this period is because our value-added products, which are critical to the performance of our customers' products, typically represent only a small portion of our customers' overall end-product costs.

Adjusted EBITDA Margin (1)



(1) Legacy Eco Adjusted EBITDA margin is presented for 2012 through 2014, pro forma Adjusted EBITDA margin is presented for 2015 and 2016 and Adjusted EBITDA margin is presented for the first half of 2017. As a result, Adjusted EBITDA margin for 2012 through 2014 consists only of the results of our accounting predecessor and may not be representative of margins for our entire business for such periods. See footnote (4) to "Summary Historical and Unaudited Pro Forma Financial and Other Data" for a description of the treatment of our Zeolyst Joint Venture in our consolidated financial information.

Our products are predominantly inorganic and carbon-free, and are produced from readily available raw materials such as industrial sand and soda ash, which prices have historically been less volatile than oil. We also use natural gas in our furnaces where our North American facilities have benefited from the plentiful supplies of shale gas. In addition, we have long-term supply contracts with many of our key raw materials suppliers across our product groups. We have also been able to mitigate the impact of raw material or energy price volatility using a variety of mechanisms, including hedging and raw material cost pass-through clauses in our sales contracts and other adjustment provisions. For the year ended December 31, 2016, approximately 45% of our North American silicate pro forma sales, which is a significant portion of our performance chemicals product group sales, and approximately 94% of our refining services product group pro forma sales were sold under contracts that included raw material pass-through clauses.

Our cash flow generation is driven, in part, by our disciplined capital investment and tax attributes that may provide cash flow benefits in the future. We have invested in our infrastructure and growth over the last three years and we expect to realize returns on these investments in the future with limited additional investment requirements, although there is no assurance that we will be able to realize any returns on these investments or that significant additional investments will not be required. As of December 31, 2016, we had \$383.2 million of net operating losses for U.S. federal income tax purposes, along with related net operating losses for state tax purposes, and \$671.4 million of identified intangibles and goodwill from the Business Combination transaction, both of which may provide us with additional cash tax savings in future years in which we generate taxable income.

Strong Growth Potential Across the Portfolio

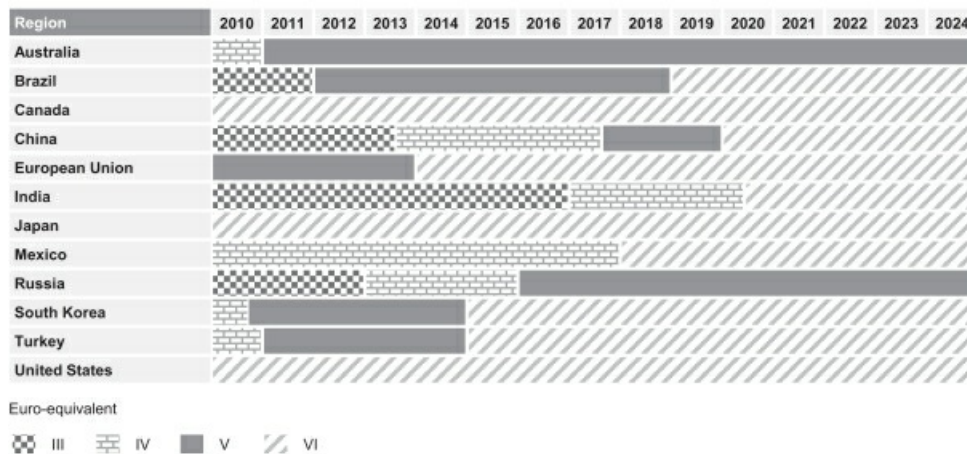
We focus on serving end use applications where we believe significant future growth potential exists. Our products address our customers' needs, which are typically driven either by regulatory regimes or consumer preferences, on a global basis. In addition, our product sales and development efforts are driven by regional infrastructure and development trends. In vehicles, we address regulated heavy- and light-duty diesel emission standards and sulfur content and vapor pressure requirements in gasoline. We expect that these regulations will create growth opportunities in excess of gross domestic product growth rates due to the constantly evolving standards that our customers need to address with new and improved products.

Light- and heavy-duty diesel engines are subject to a broad set of regulatory requirements, and we expect that these increasingly stringent standards will offer opportunities for our Zeolyst Joint Venture to develop

products to assist our customers in meeting these standards. Countries typically adopt a set of standards that limit the amount of nitrogen oxides, carbon dioxide, and other emissions allowed for diesel engines. In many cases countries have established regulations that generally follow United States Environmental Protection Agency or European Union standards, but typically on a later implementation timeline. In addition, even more restrictive regulations are expected to be adopted in the future in many jurisdictions, such as EU VII, which would further reduce permitted emissions levels in the European Union. We believe that compliance with existing regulations as well as any future regulations provides us with opportunities to grow our sales of emissions control catalysts.

The following chart identifies the regulatory requirements for certain countries and regions in relation to the most comparable European Union standard for ease of comparability. See “Industry—Fuels & Emissions Controls” for more information regarding the European Union standards referred to in the chart below.

Timeline for Implementation of Regionwide Emissions Standards for Diesel Heavy-Duty Vehicles in European Union Equivalent Standards



Source: The International Council on Clean Transportation

Given the fuel efficiency standards that are driving the design of new engines and the resulting higher-octane gasoline requirements that can be achieved through alkylate blending, we believe that our refining services product group is well positioned to benefit from any related growth in demand for alkylates.

We produce catalysts for HDPE and methyl methacrylate production in the packaging and engineered plastics applications. According to an industry source, North American HDPE capacity is expected to grow at a compound annual growth rate of approximately 5.1% between 2016 and 2020, driven by North America’s global cost position in petrochemicals and increased use of these plastics as a substitute for heavier and less versatile materials such as glass and metal. Methyl methacrylate is the monomer for acrylic engineering resins, a clear scratch-resistant plastic used in sheet form to replace glass and as a surface coating. We believe that we have an opportunity to grow our methyl methacrylate catalysts sales in the future as methyl methacrylate production increases as a result of, in part, increased production efficiencies enabled by our catalysts.

We believe that additional demand for retroreflectivity (or visibility) for roadway and aviation markings could provide us with significant growth opportunities. We benefit from increased use and density per mile of

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road markings that include our products. The most recent innovation from our performance materials product group is our ThermoDrop product, which simplifies the road striping operations for our customers by using a new durable thermal plastic road marking material. We have also introduced a new faster-drying road marking system, Visilok, which can reduce traffic disruption during striping operations and improve road worker safety by reducing the amount of time needed to complete the road marking process.

We also expect to benefit from trends towards the use of more environmentally friendly products where we believe we have opportunities to displace other less environmentally friendly materials. While there is no assurance that such trends will continue in the future, we believe our product offerings position us to capitalize on this growth opportunity. For example, our Ambosol magnesium silicate is used to eliminate color and odors in polyols, which are used in the production of polyurethane for, among other things, household products such as scratch-resistant coatings and foam insulation. In addition, our specialty silicates are displacing phosphates in dish detergents, precipitated silicas are displacing carbon black in tires, and solid and hollow microspheres are displacing plastic volumes in lightweighting applications. Most of our products are manufactured from commonly found materials such as industrial sand and soda ash, which are more environmentally friendly than carbon-based products. We have also developed a family of gentle silica-based dentifrice abrasives that produce more effective cleaning toothpastes and we have developed a product family, Britesil silicates, which improves convenience while eliminating phosphates in automatic dishwashing applications.

Experienced Management Team

Our senior management team has substantial industry experience and a proven track record. They average over 30 years of experience in our product groups, and their cumulative industry experience extends to a broad range of execution capabilities, including acquisition integration, strategic management, operations, sales and marketing, and new product and application development. In 2016, our management team integrated legacy Eco into our environmental catalysts and services business while also growing the business and successfully implementing cost initiatives. Our senior management team has also reorganized our company from a products-based business to a markets-based business to better align our offerings with the needs of our customers. There is a renewed focus on serving our customers by developing solutions through technical sales, services, and product development, and we have added additional management personnel experienced in innovation and market driven organizations. Our management owns approximately 11% of our outstanding common stock immediately prior to this offering, which we believe creates an alignment of interest with our shareholders.

Our Business Strategy

Our business strategy is to capitalize on our strong foundation, market-based approach, and management team to grow sales profitably, deploy capital efficiently, and generate free cash flow in order to create shareholder value. We believe that our history of operational excellence, technology leadership, and strong business execution developed from our almost two centuries of combined industry experience at legacy PQ and legacy Eco positions us well to execute on our business strategy. In the last two years, we have added senior executives to our management team, including our chief executive officer, Jim Gentilcore, and chief financial officer, Mike Crews, who bring significant public company leadership experience and a track record of customer-focused innovation and disciplined capital allocation to our business. We believe that Mr. Gentilcore's experience in the electronics industry is particularly relevant to our innovation efforts as we pursue new product innovation across our product groups. In addition, we believe that our recent reorganization better aligns our management structure with our customer needs to enable us to make more focused sales and product innovation

investments. We believe there are significant opportunities to profitably grow our business, generate free cash flow and deliver shareholder value by executing on the following strategies:

Shift from a Products-based to a Markets-based Company

Our reorganization from a products-based to a markets-based company is fundamental to our growth strategy. Following the consummation of the Business Combination in May 2016, we have further realigned our product groups around critical markets that we serve. The combination of the legacy Eco and legacy PQ businesses expanded our presence in the refinery industry and provided us with valuable insight into key success factors for serving our refining and petrochemical customers. We have undertaken a similar approach in other important end uses that we serve such as personal care, highway safety, oil and gas, surface coatings, and electronics.

Our solution-oriented process starts with our customer's specific needs, which are then identified as a product or service opportunity that is defined, sized, and evaluated to determine if it is within the core strength of our global development team. If not within our core capabilities, but determined to be a strategically important opportunity, we initiate a search for outside technology, partnerships, or acquisition targets that can deliver a cost-effective and profitable solution. This approach is in contrast to our prior approach developing products or new formulations first and then seeking to identify applications into which to sell that product or new formulation. We believe that our markets-based approach will result in product innovation that better meets our customers' needs and supports our profitable growth.

Our sales and marketing organization has a broad base of customer and marketing experience. Since our business reorganization, we believe each of our operating segments has simplified its customer contact points and increased knowledge about the industries we serve. We have been able to eliminate duplicate sales calls that would occur among our previous business divisions and can prioritize our efforts around our most influential customer contacts. We have also removed the silos that previously impeded our ability to share important customer information within our organization. This integrated marketing effort allows for more rapid analysis and decision-making for our major strategic customers who are often served by multiple product groups. We believe these operational improvements will enable us to reduce product commercialization time and increase our return on marketing investment.

Prioritize Investment and Development to Innovate and Profitably Grow Sales

We have been able to successfully grow our sales into new applications through our innovation and development of new products to address evolving customer needs. For example, our zeolite catalysts product group developed new products to address new regulatory standards regarding vehicle emissions, and our performance chemicals product group collaborated with our customers to develop precipitated silica products to address their demands for more green tires. We will continue to focus on collaboration with our customers through our technical sales and research and development teams to better understand and address our customers' evolving needs and invest in our growth by prioritizing innovation driven by these identified needs.

Within our innovation and product development process, our technology teams work closely with our customer facing teams to identify compelling customer needs that can be addressed through innovation or new product development. We seek to assess technology and commercialization hurdles early on in the development process so that we can quickly and efficiently evaluate our opportunity and, where appropriate, deprioritize, or abandon projects before expending significant resources. We are improving the way our research and development team shares information by removing silos and holding regular senior-level project reviews to ensure best practices are shared and consistent metrics are used to determine a project's merit and the size of the potential opportunity. We have already begun to see the benefits of our new processes with the successful

commercialization of ThermoDrop, which we launched in February 2017. We collaborated with key customers to develop the ThermoDrop technology, which uses our highway safety microspheres and a proprietary striping application technology to enable our customers to more efficiently stripe highways. This technology has received strong customer acceptance since launch, and we are increasing our production to meet anticipated demand.

We will also selectively consider acquisitions as part of our growth strategy. We believe that our integration of legacy Eco demonstrates our ability to successfully execute on acquisitions and realize available synergies and other benefits. We have identified a number of potential acquisition targets with complementary fits across both of our operating segments and, consistent with our markets-based focus, these targets also include downstream-focused businesses. We will seek to use acquisitions to increase our geographic presence, diversify our product offerings, and further secure our leadership positions with our customer base. We intend to focus our acquisition efforts on opportunities in our higher value-added solutions within or adjacent to our current product offerings. We intend to pursue these transactions in a disciplined manner by rigorously evaluating return on capital against our cost of capital in addition to the potential strategic benefits. However, as of June 30, 2017, we had cash and cash equivalents of \$50.5 million and total outstanding indebtedness of approximately \$2,728.4 million, which may limit our ability to pursue acquisition transactions or other aspects of our growth strategy.

Maintain Strong Margins and Cash Flow with Continuous Improvement Initiatives

Our margins historically have been stable due to our strong and long-standing value proposition to our customers and our strong technological, operational, and product capabilities. We intend to maintain and improve upon these margins by leveraging our operational excellence and continuing our approach to raw material cost pass-through and other appropriate cost sharing arrangements with our customers. We believe that our new organizational structure will allow us to better leverage distribution channels across our products in order to address end uses such as paints and coatings, personal care, and oil and gas, and we have also integrated our continuous improvement teams across our operating segments. For example, we have established a new global furnace operations team, a global engineering team, and a global sales and operations planning team to share best practices across all of our product groups. We have also formalized our sharing of best practices across many functional disciplines, such as supply chain, technology, working capital, and capital expenditure management. From these efforts, we expect to be able to reduce costs in our operations in order to increase our cash flow.

Recent Developments

On August 7, 2017, PQ Corporation repriced its existing senior secured term loan facility, which consists of a \$927.8 million U.S. dollar-denominated tranche and a €283.3 million Euro-denominated tranche, to reduce the applicable interest rates. The repriced term loan facility has substantially identical terms to the prior facility, except that (a) U.S. dollar-denominated borrowings bear interest at the rate equal to, at our option (1) a margin of 2.25% plus a base rate or (2) a margin of 3.25% plus a LIBOR rate (subject to a floor of 0%) determined by reference to the cost of funds for U.S. dollar deposits, subject to certain adjustments and other events, and (b) Euro-denominated borrowings bear interest at a rate equal to, at our option (1) a margin of 2.25% plus a base rate or (2) a margin of 3.25% plus a EURIBOR rate (subject to a floor of 0.75%) determined by reference to the cost of funds for Euro deposits, subject to certain adjustments and other events. The repriced term loan facility is expected to reduce our annual interest expense by approximately \$12.5 million. See “Description of Certain Indebtedness—Senior Secured Credit Facilities” for additional information regarding the senior secured term loan facility.

Risk Factors

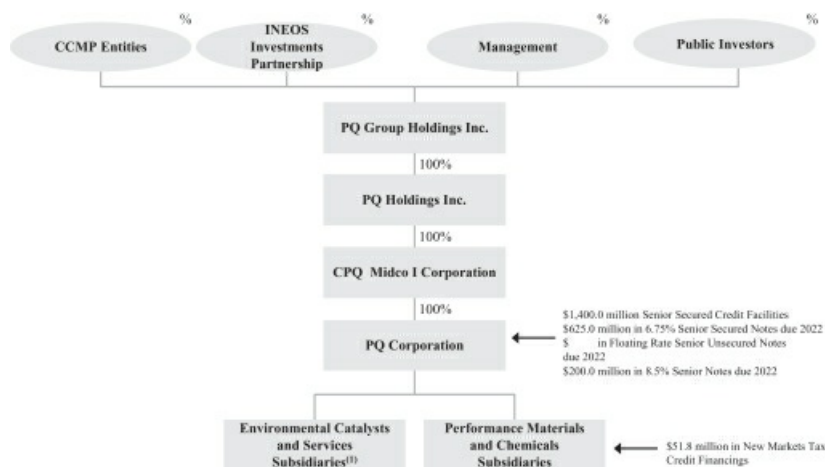
An investment in our common stock involves a high degree of risk. Any of the factors set forth under “Risk Factors” may limit our ability to successfully execute on our business strategy. You should carefully consider all of

the information set forth in this prospectus and, in particular, should evaluate the specific factors set forth under “Risk Factors” in deciding whether to invest in our common stock. Among these important risks are the following:

- as a global business, we are exposed to local business risks in different countries, which could have a material adverse effect on our financial condition, results of operations and cash flows;
- as of June 30, 2017, we had total outstanding indebtedness of approximately \$2,728.4 million and our substantial debt could adversely affect our liquidity and ability to raise additional capital to fund our operations and limit our ability to pursue our growth strategy or react to changes in the economy or our industry;
- we are affected by general economic conditions and an economic downturn could adversely affect our operations and financial results;
- alternative technology or other changes in our customers’ products may reduce or eliminate the need for certain of our products and limit our ability to capitalize on our long-term customer relationships;
- if we are unable to pass on increases in raw material prices, including natural gas, to our customers or to retain or replace key suppliers, our business strategy to maintain and improve upon our margins as well as our results of operations and cash flows may be negatively affected;
- certain of our product groups are subject to government regulation and future government regulation could limit our growth potential; and
- upon completion of this offering, CCMP and INEOS will continue to have significant influence over us, which could limit your ability to influence the outcome of key transactions, including a change of control.

Our Corporate Structure

The following chart illustrates our ownership structure as of June 30, 2017 after giving effect to this offering:



(1) Our zeolite catalysts product group within our environmental catalysts and services reporting segment operates through our Zeolyst Joint Venture.

Our Principal Stockholders

Investment funds affiliated with CCMP, INEOS Investments Partnership (“INEOS”) and members of management and our board of directors acquired their respective ownership of PQ Group Holdings as a result of the following series of transactions:

- In December 2014, investment funds affiliated with CCMP acquired an approximate 49% equity interest in PQ Holdings. INEOS and members of management owned the remaining approximate 51% equity interest in PQ Holdings.
- Also in December 2014, investment funds affiliated with CCMP acquired an approximate 95% equity interest in Eco Services Group Holdings LLC, the indirect parent of Eco. Members of Eco’s management owned the remaining approximate 5% equity interest in Eco Services Group Holdings LLC.
- In May 2016, we completed the Business Combination, in which the equity interests of PQ Holdings and Eco Services Group Holdings LLC were converted into equity interests in PQ Group Holdings.

As of June 30, 2017, and prior to giving effect to this offering and the Reclassification, investment funds affiliated with CCMP, INEOS, and members of management and our board of directors owned equity securities representing approximately 58%, 31%, and 11%, respectively, of our voting power. Investment funds affiliated with CCMP and INEOS will continue to have significant influence over us and decisions made by our stockholders upon completion of this offering and may have interests that differ from yours. See “Risk Factors—Risks Related to this Offering and to our Common Stock.”

CCMP is a leading global private equity firm specializing in buyouts and growth equity investments in companies ranging from \$250 million to more than \$3 billion in assets. CCMP’s founders have invested over \$16 billion since 1984, which includes their activities at J.P. Morgan Partners, LLC (a private equity division of JPMorgan Chase & Co.) and its predecessor firms. CCMP was formed in August 2006 when the buyout and growth equity investment professionals of J.P. Morgan Partners, LLC separated from JPMorgan Chase & Co. to commence operations as an independent firm. The foundation of CCMP’s investment approach is to leverage the combined strengths of its deep industry expertise and proprietary operating resources to create value by investing in three targeted industries—Industrial, Consumer and Healthcare.

INEOS is a leading manufacturer of petrochemicals, specialty chemicals and oil products. Comprising 18 businesses, with a production network spanning 105 manufacturing facilities in 22 countries, it produces more than 60 million tonnes of petrochemicals, 20 million tons per annum of crude oil refined products (fuels) and in 2016 it had sales of approximately \$40 billion. Worldwide, INEOS employs 18,500 people. Its management philosophy is to operate a simple and decentralized organizational structure.

Additional Information

PQ Group Holdings Inc. was incorporated in Delaware on August 7, 2015. PQ Holdings Inc., a manufacturer of catalysts, specialty materials and chemicals, was incorporated in Delaware on June 22, 2007. Eco Services Operations LLC, which acquired substantially all of the assets of Solvay USA Inc.’s sulfuric acid refining services business unit on December 1, 2014, was incorporated in Delaware on July 30, 2014. On May 4, 2016, we consummated the Business Combination to reorganize and combine the businesses of PQ Holdings Inc. and Eco Services Operations LLC under a new holding company, PQ Group Holdings Inc. We refer to the business of PQ Holdings Inc. prior to the Business Combination as “legacy PQ” and we refer to the business of Eco Services Operations LLC prior to the Business Combination as “legacy Eco.”

Our principal executive offices are located at 300 Lindenwood Drive, Valleybrooke Corporate Center, Malvern, Pennsylvania 19355, and our telephone number is (610) 651-4400. Our website address is www.pqcorp.com. The information that appears on, or that can be accessed through, our website is not part of, and is not incorporated into, this prospectus, and you should not rely on any such information in making the decision whether to purchase our common stock.

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The Offering	
Common stock offered by us	shares (or shares if the underwriters exercise their option to purchase additional shares in full).
Underwriters' option to purchase additional shares	We have granted the underwriters a 30-day option from the date of this prospectus to purchase up to an additional shares.
Common stock to be outstanding after this offering	shares (or shares if the underwriters exercise the option to purchase additional shares in full). See "Description of Capital Stock." For additional information regarding the impact of a change in the initial public offering price on the number of shares outstanding after completion of this offering related to the conversion of our Class B common stock, see "The Reclassification."
Use of proceeds	<p>We expect to receive net proceeds, after deducting underwriting discounts and commissions and estimated expenses payable by us, of approximately \$ million (or approximately \$ million if the underwriters exercise their option to purchase additional shares in full), based on an assumed initial public offering price of \$ per share, which is the midpoint of the price range set forth on the cover of this prospectus.</p> <p>We intend to use the net proceeds from the sale of our common stock in this offering to redeem approximately \$ million in aggregate principal amount of PQ Corporation's Floating Rate Senior Unsecured Notes due 2022, including accrued and unpaid interest, and applicable redemption premiums, and the remaining net proceeds, if any, for general corporate purposes. See "Use of Proceeds."</p>
Dividend policy	Our board of directors does not currently intend to pay dividends on our common stock. See "Dividend Policy."
Risk factors	Investing in our common stock involves a high degree of risk. You should read carefully the "Risk Factors" section of this prospectus, beginning on page 27, for a discussion of factors that you should consider before deciding to invest in our common stock.
Proposed stock exchange symbol	"PQG."

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Except as otherwise indicated, the number of shares of our common stock to be outstanding after this offering is based on _____ shares outstanding as of _____, 2017 after giving effect to the Reclassification, assuming an initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus. Because the number of shares of our common stock into which a share of our Class B common stock is convertible will be determined by reference to the initial public offering price in this offering, a change in the initial public offering price would have a corresponding impact on the number of outstanding shares of our common stock presented in this prospectus after giving effect to this offering. See “The Reclassification.” Except as otherwise indicated, the number of shares of our common stock to be outstanding after this offering excludes:

- _____ shares of our common stock issuable upon exercise of stock options issued and outstanding as of June 30, 2017 under the PQ Group Holdings Inc. Stock Incentive Plan at a weighted average exercise price of \$ _____ per share; and
- _____ shares of our common stock reserved for issuance under our 2017 Omnibus Incentive Plan (the “2017 Plan”).

**SUMMARY HISTORICAL AND UNAUDITED PRO FORMA
FINANCIAL AND OTHER DATA**

The following tables set forth our summary historical and unaudited pro forma financial and other data as of the dates and for the periods indicated. The statement of operations data and cash flows data for the six month periods ended June 30, 2017 and 2016 and the historical balance sheet data as of June 30, 2017 presented below have been derived from our unaudited consolidated financial statements included elsewhere in this prospectus. The statement of operations data and cash flows data for the years ended December 31, 2016 and 2015 and the balance sheet data as of December 31, 2016 and 2015 presented below have been derived from our audited consolidated financial statements included elsewhere in this prospectus. The statement of operations data and cash flows data for the period from inception (July 30, 2014) to December 31, 2014 have been derived from our Successor period financial statements included elsewhere in this prospectus. The balance sheet data as of December 31, 2014 has been derived from our Successor period financial statements not included in this prospectus. The statement of operations data and cash flows data for the period from January 1, 2014 to November 30, 2014 have been derived from our Predecessor period financial statements included elsewhere in this prospectus. The historical financial data of legacy PQ for the years ended December 31, 2015, 2014 and 2013 has been derived from legacy PQ's audited consolidated financial statements included elsewhere in this prospectus. The historical financial data of legacy PQ for the period from January 1, 2016 through May 3, 2016 and for the year ended December 31, 2012 has been derived from legacy PQ's consolidated financial statements not included in this prospectus. See "Basis of Financial Presentation."

The unaudited pro forma statement of operations data for the years ended December 31, 2016 and 2015 gives effect to the Business Combination and the related financing transactions as if they occurred on January 1, 2015 and is derived from our historical consolidated financial statements and legacy PQ consolidated financial statements included elsewhere in this prospectus. Unaudited pro forma balance sheet data as of June 30, 2017 and statement of operations data for the six months ended June 30, 2017 is not presented because the Business Combination and related financing transactions are included in our consolidated financial results as of such date and for such periods. The unaudited pro forma statement of operations data is illustrative and not intended to represent what our results of operations would have been had the Business Combination and related financing transactions occurred on January 1, 2015 or to project our results of operations for any future period. The unaudited pro forma statement of operations data may not be comparable to, or indicative of, future performance.

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This summary historical and unaudited pro forma financial and other data should be read in conjunction with the disclosures set forth under “Capitalization,” “Unaudited Pro Forma Financial Information of PQ Group Holdings” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and the related notes thereto appearing elsewhere in this prospectus.

	Six months ended June 30,		Pro forma years ended December 31,		Years ended December 31,		Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014	Legacy PQ year ended December 31, 2014
	2017	2016	2016	2015	2016	2015			
	Unaudited		Unaudited						
(Dollars in thousands)									
Statement of operations data:									
Sales	\$ 722,198	\$ 371,467	\$ 1,403,041	\$ 1,413,201	\$ 1,064,177	\$ 388,875	\$ 35,539	\$ 361,823	\$ 1,114,904
Cost of goods sold	532,072	283,068	1,037,109	1,048,739	810,085	278,791	30,160	265,829	818,483
Gross profit	190,126	88,399	365,932	364,462	254,092	110,084	5,379	95,994	296,421
Selling, general and administrative expenses	69,378	38,014	145,041	140,891	107,601	34,613	2,623	45,168	110,886
Other operating expense, net	27,324	25,588	74,972	67,666	62,301	19,696	16,347	5,593	71,148
Operating income (loss)	93,064	24,797	145,919	155,905	84,190	55,775	(13,591)	45,233	114,387
Equity in net (income) loss from affiliated companies	(14,622)	4,693	(35,210)	(41,078)	2,612	—	—	—	29,359
Interest expense, net	94,961	45,752	187,945	199,614	140,315	44,348	8,470	86	111,553
Debt extinguishment costs	—	11,858	1,793	—	13,782	—	—	—	2,476
Other (income) expense, net	16,613	3,024	(8,869)	21,383	(3,402)	—	—	—	23,886
(Loss) income before income taxes and noncontrolling interest	(3,888)	(40,530)	260	(24,014)	(69,117)	11,427	(22,061)	45,147	5,831
(Benefit) provision for income taxes	97	39,549	57,967	1,157	10,041	—	—	14,602	7,548
Net (loss) income	(3,985)	(80,079)	(57,707)	(25,171)	(79,158)	11,427	(22,061)	30,545	(1,717)
Less: Net income attributable to the noncontrolling interest	78	314	1,225	1,771	588	—	—	—	1,894
Net (loss) income attributable to PQ Group Holdings Inc.	\$ (4,063)	\$ (80,393)	\$ (58,932)	\$ (26,942)	\$ (79,746)	\$ 11,427	\$ (22,061)	\$ 30,545	
Net (loss) income attributable to legacy PQ									\$ (3,611)

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	Six months ended June 30,		Years ended December 31,		Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
	2017	2016	2016	2015		
	Unaudited					
Earnings (loss) per share:						
Basic						
Class B shares	\$ —	\$ —	\$ —	\$ 7.58	\$ (14.78)	
Class A shares	(9.45)	(186.90)	(185.43)	—	—	
Diluted						
Class B shares	\$ —	\$ —	\$ —	\$ 7.58	\$ (14.78)	
Class A shares	(9.45)	(186.90)	(185.43)	—	—	
Pro Forma						
Class B shares	\$ —	\$ —	\$ —	\$ —	\$ —	
Class A shares	—	—	(137.03)	—	—	
Weighted average shares outstanding:						
Basic						
Class B shares	6,679,077	3,224,645	4,947,982	1,507,719	1,492,682	
Class A shares	429,985	430,136	430,051	—	—	
Diluted						
Class B shares	6,679,077	3,224,645	4,947,982	1,507,719	1,492,682	
Class A shares	429,985	430,136	430,051	—	—	
Pro Forma						
Class B shares	—	—	4,947,982	—	—	
Class A shares	—	—	430,051	—	—	
	2017	2016	2016	2015	Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
(Dollars in thousands)	Unaudited					
Balance sheet data (at end of period):						
Cash and cash equivalents	\$ 50,457		\$ 70,742	\$ 25,155	\$ 22,627	
Property, plant and equipment, net	1,203,925		1,181,388	481,073	472,156	
Total assets	4,390,031		4,259,671	1,007,636	1,025,094	
Total debt, including current portion	2,676,048		2,562,198	673,101	675,254	
Total stockholders' equity	1,064,416		1,027,944	235,293	217,824	
Cash flows data:						
Net cash provided by (used in):						
Operating activities	\$ 21,751	\$ (4,372)	\$ 119,720	\$ 44,715	\$ (2,057)	\$ 57,593
Investing activities	(103,556)	(1,831,479)	(1,929,680)	(38,725)	(888,347)	(32,852)
Financing activities	66,819	1,859,474	1,861,433	(3,462)	913,031	(24,741)

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(Dollars in thousands)	Six months ended		Pro forma year ended		Year ended		Successor	Predecessor	
	June 30,		December 31,		December 31,		Period from	Period from	Legacy PQ
	2017	2016	2016	2015	2016	2015	(July 30, 2014) to December 31, 2014	January 1, 2014 to November 30, 2014	year ended December 31, 2014
Unaudited									
Non-GAAP and other financial and operating data(1):									
Sales:									
Sales	\$ 722,198	\$ 371,467	\$ 1,403,041	\$ 1,413,201	\$ 1,064,177	\$ 388,875	\$ 35,539	\$ 361,823	\$ 1,114,904
Constant currency sales(2)	722,198	367,517	1,392,655	1,375,230	1,057,714	388,875	35,539	361,823	973,943
Adjusted EBITDA(3):									
Adjusted EBITDA	\$ 223,945	\$ 118,653	\$ 420,746	\$ 413,145	\$ 331,533	\$ 117,704	\$ 9,122	\$ 98,075	\$ 288,101
Constant currency Adjusted EBITDA	223,945	117,666	417,762	404,728	329,694	117,704	9,122	98,075	258,522

(Dollars in thousands)	Six months ended		Year ended	
	June 30,		December 31,	
	2017	2016	2016	2014
Unaudited				
Zeolyst Joint Venture operating data:				
Total net sales(4)	\$ 63,369	\$ 20,276	\$ 131,265	\$ 159,818
			\$ 106,734	

(1) To supplement our financial information presented in accordance with GAAP, we use the following non-GAAP financial measures to clarify and enhance an understanding of the historical results of our entire business: constant currency sales, Adjusted EBITDA, pro forma Adjusted EBITDA, constant currency Adjusted EBITDA, constant currency pro forma Adjusted EBITDA, Adjusted EBITDA margin and pro forma Adjusted EBITDA margin (collectively, the “Non-GAAP Financial Measures”). We believe that the presentation of these Non-GAAP Financial Measures enhances an investor’s understanding of our financial performance. We further believe that these Non-GAAP Financial Measures are 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. We also believe that these financial measures provide investors with a useful tool for assessing the comparability between periods as a result of the 2014 Acquisition and the Business Combination. We use these Non-GAAP Financial Measures for business planning purposes and in measuring our performance relative to that of our competitors. Each of the Adjusted EBITDA Non-GAAP Financial Measures presented in this prospectus includes an adjustment for depreciation, amortization and interest of our 50% share of our Zeolyst Joint Venture, which is accounted for under the equity method of accounting.

We believe these Non-GAAP Financial Measures are commonly used by investors to evaluate our performance and that of our competitors. However, our use of such Non-GAAP Financial Measures may vary from that of others in our industry. These Non-GAAP Financial Measures should not be considered as alternatives to sales, operating income (loss), net income (loss), earnings per share, cash flows data or any other performance measures derived in accordance with GAAP as measures of operating performance or operating cash flows or as measures of liquidity.

EBITDA consists of net (loss) income attributable to us 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 that are included in net income and EBITDA that we do not consider indicative of our ongoing operating performance, and (iii) depreciation, amortization and interest of our Zeolyst Joint Venture as described above. In the case of Adjusted EBITDA, we believe that making such adjustments provides investors meaningful information to understand our operating results and analyze financial and business trends on a period-to-period basis.

EBITDA and Adjusted EBITDA have important limitations as analytical tools and you should not consider them in isolation or as substitutes for analysis of our results as reported under GAAP. Some of these limitations are:

- EBITDA and Adjusted EBITDA:
 - do not reflect the significant interest expense on our debt;
 - exclude impairments and adjustments for step-up amortization; and
 - do not reflect our cash expenditures, or future requirements, for capital expenditures or contractual commitments;
- although depreciation and amortization are non-cash charges, the assets being depreciated and amortized will often have to be replaced in the future, and EBITDA and Adjusted EBITDA do not reflect any cash requirements for such replacements; and
- other companies in our industry may calculate EBITDA and Adjusted EBITDA differently than we do, limiting their usefulness as comparative measures.

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Because of these limitations, EBITDA and Adjusted EBITDA should not be considered as measures of discretionary cash available to us to invest in the growth of our business. We compensate for these limitations by relying primarily on our GAAP results and using these Non-GAAP Financial Measures only supplementally.

In calculating EBITDA and Adjusted EBITDA, we add back certain non-cash, nonrecurring and other items and make certain adjustments that are based on assumptions and estimates. In addition, in evaluating these Non-GAAP Financial Measures, you should be aware that in the future we may incur expenses similar to those eliminated in this presentation. Our presentation of EBITDA and Adjusted EBITDA should not be construed as an inference that our future results will be unaffected by unusual or nonrecurring items.

Constant currency information reflects comparative local currency financial information at the average foreign exchange rates for the six months ended June 30, 2017 for all historical periods. This measure provides information on sales and Adjusted EBITDA assuming that foreign currency exchange rates had not changed between current and historical periods. The company believes such Non-GAAP Financial Measures, when used in conjunction with the GAAP measures of sales and net income (loss) at actual currency rates, provides additional insight into the company's operations, particularly in evaluating performance from one period to another without the impact of foreign currency changes.

- (2) The following table reconciles sales to constant currency sales for the periods presented.

(Dollars in thousands)	Six months ended June 30,		Pro forma year ended December 31,		Year ended December 31,		Successor Period from inception (July 30, 2014) to December 31,	Predecessor Period from January 1, 2014 to November 30,	Legacy PQ year ended December 31,
	2017	2016	2016	2015	2016	2015	2014	2014	2014
	Unaudited								
Sales:									
Sales	\$ 722,198	\$ 371,467	\$ 1,403,041	\$ 1,413,201	\$ 1,064,177	\$ 388,875	\$ 35,539	\$ 361,823	\$ 1,114,904
Foreign currency impact ^(a)	—	(3,950)	(10,386)	(37,971)	(6,463)	—	—	—	(140,961)
Constant currency sales	<u>\$ 722,198</u>	<u>\$ 367,517</u>	<u>\$ 1,392,655</u>	<u>\$ 1,375,230</u>	<u>\$ 1,057,714</u>	<u>\$ 388,875</u>	<u>\$ 35,539</u>	<u>\$ 361,823</u>	<u>\$ 973,943</u>

- (a) Represents the foreign currency impact on sales applying the average exchange rates in effect for the six months ended June 30, 2017. The foreign currency impact attributable to our environmental catalysts and services segment was \$(357) for the six months ended June 30, 2016, \$(1,256) and \$(3,943) for the pro forma years ended December 31, 2016 and 2015, respectively, \$(530) for the year ended December 31, 2016 and \$(6,732) for legacy PQ's year ended December 31, 2014. The foreign currency impact attributable to our performance materials and chemicals segment was \$(3,593) for the six months ended June 30, 2016, \$(9,130) and \$(34,028) for the pro forma years ended December 31, 2016 and 2015, respectively, \$(5,933) for the year ended December 31, 2016 and \$(134,229) for legacy PQ's year ended December 31, 2014.

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(3) The following tables reconcile net income (loss) to EBITDA, Adjusted EBITDA and constant currency Adjusted EBITDA for the periods and for the entities presented.

	Six months ended June 30,		Pro forma year ended December 31,		Year ended December 31,		Successor	Predecessor
	2017	2016	2016	2015	2016	2015	Period from inception (July 30, 2014) to December 31, 2014	Period from January 1, 2014 to November 30, 2014
(Dollars in thousands)								
Reconciliation of net income (loss) attributable to PQ Group Holdings Inc. to Adjusted EBITDA								
Net income (loss) attributable to PQ Group Holdings Inc.	\$ (4,063)	\$ (80,393)	\$ (58,932)	\$ (26,942)	\$ (79,746)	\$ 11,427	\$ (22,061)	\$ 30,545
Provision (benefit) for income taxes	97	39,549	57,967	1,157	10,041	—	—	14,602
Interest expense, net	94,961	45,752	187,945	199,614	140,315	44,348	8,470	86
Depreciation and amortization	83,206	41,991	165,843	152,172	128,288	38,999	2,955	42,458
EBITDA	\$ 174,201	\$ 46,899	\$ 352,823	\$ 326,001	\$ 198,898	\$ 94,774	\$ (10,636)	\$ 87,691
Joint venture depreciation, amortization and interest(a)	5,510	1,844	10,263	7,928	6,920	—	—	—
Amortization of investment in affiliate step-up(b)	5,282	12,315	5,838	6,634	34,786	—	—	—
Amortization of inventory step-up(c)	871	17,714	4,912	—	30,596	—	3,511	—
Impairment of long-lived and intangible assets	—	—	6,873	425	6,873	—	—	—
Debt extinguishment costs	—	11,858	1,793	—	13,782	—	—	—
Net loss (gain) on asset disposal(d)	2,925	1,661	4,805	5,459	4,216	3,911	—	—
Foreign currency exchange loss (gain)(e)	16,356	3,090	(8,975)	21,058	(3,558)	—	—	—
Non-cash revaluation of inventory, including LIFO	2,479	446	1,343	(2,088)	1,310	—	—	—
Management advisory fees(f)	2,500	1,083	5,250	5,590	3,583	590	42	—
Transaction and other related cost(g)	4,334	4,544	2,648	13,219	4,664	4,241	15,506	—
Equity-based and other non-cash compensation	2,828	3,779	6,487	4,155	7,042	2,256	—	535
Restructuring, integration and business optimization expense(h)	3,052	11,728	17,857	8,644	16,258	4,147	247	—
Defined benefit plan pension cost(i)	1,409	1,398	2,752	6,116	1,375	2,903	—	—
Transition services(j)	—	—	—	4,882	—	4,882	—	—
Other legacy Eco adjustment(k)	—	—	—	—	—	—	—	9,849
Other(l)	2,198	294	6,077	5,122	4,788	—	452	—
Adjusted EBITDA	\$ 223,945	\$ 118,653	\$ 420,746	\$ 413,145	\$ 331,533	\$ 117,704	\$ 9,122	\$ 98,075
Foreign currency impact(m)	—	(987)	(2,984)	(8,417)	(1,839)	—	—	—
Constant currency Adjusted EBITDA	\$ 223,945	\$ 117,666	\$ 417,762	\$ 404,728	\$ 329,694	\$ 117,704	\$ 9,122	\$ 98,075

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	Three months ended March 31, 2016	Period from January 1, 2016 through May 3, 2016	Year ended December 31,			
			Unaudited			
	2015	2014	2013	2012		
(Dollars in thousands)						
Reconciliation of legacy PQ net income (loss) to legacy PQ Adjusted EBITDA						
Net income (loss) attributable to legacy PQ	\$ 1,102	\$ (38,337)	\$ 7,851	\$ (3,611)	\$ 26,730	\$ 5,184
Provision (benefit) for income taxes	3,904	11,391	22,902	7,548	10,608	18,918
Interest expense, net	26,413	37,310	108,375	111,553	120,347	111,228
Depreciation and amortization	23,621	32,052	93,122	91,342	89,306	93,416
EBITDA	\$ 55,040	\$ 42,416	\$ 232,250	\$ 206,832	\$ 246,991	\$ 228,746
Joint venture depreciation, amortization and interest(a)	2,476	3,343	7,928	6,941	6,128	3,348
Amortization of investment in affiliate step-up(b)	597	796	2,387	2,387	2,387	2,593
Impairment of long-lived and intangible assets	—	—	425	—	948	—
Debt extinguishment costs	—	40,153	—	2,476	20,287	20,063
Net loss (gain) on asset disposals(d)	301	589	1,548	694	653	787
Foreign currency exchange loss (gain)(e)	(3,206)	(5,247)	21,059	23,387	4,414	(1,850)
Non-cash revaluation of inventory, including LIFO	714	33	(2,088)	846	1,152	287
Management advisory fees(f)	1,250	1,667	5,000	5,000	5,000	7,500
Transaction and other related costs(g)	299	(221)	10,742	24,405	5,594	533
Equity-based and other non-cash compensation	1,194	1,590	3,358	—	1,011	—
Restructuring, integration and business optimization expense(h)	1,563	1,599	4,496	4,572	5,449	5,644
Defined benefit plan pension cost(i)	1,025	1,377	3,213	1,832	3,581	486
Other(l)	517	1,118	5,123	8,729	3,200	547
Legacy PQ Adjusted EBITDA	\$ 61,770	\$ 89,213	\$ 295,441	\$ 288,101	\$ 306,795	\$ 268,684
Foreign currency impact(m)	(574)	(1,145)	(8,417)	(29,579)	—	—
Constant currency legacy PQ Adjusted EBITDA	\$ 61,196	\$ 88,068	\$ 287,024	\$ 258,522		

- (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. Similarly, for the year ended December 31, 2014, there was a step-up in the fair value of inventory that occurred as part of the 2014 Acquisition, which was 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 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 will cease as of the effective date of our initial public offering.
- (g) Relates to certain transaction costs described elsewhere in our consolidated financial statements included in this prospectus 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) Represents costs under a transition services agreement with Solvay that provided certain transition services to legacy Eco by Solvay following the 2014 Acquisition. The transition services agreement ended in 2015.

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- (k) Includes \$12.9 million of corporate allocations and \$(3.1) million of abatement revenue related to the 2014 Acquisition and resulting from legacy Eco historical financial statements being a carve-out from Solvay's financial statements.
 - (l) 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.
 - (m) Represents the foreign currency impact on Adjusted EBITDA applying the average exchange rates in effect for the six months ended June 30, 2017. The foreign currency impact attributable to our environmental catalysts and services segment was \$(106) for the six months ended June 30, 2016, \$(366) and \$(1,291) for the pro forma years ended December 31, 2016 and 2015, respectively, \$(184) for the year ended December 31, 2016, \$(142) for legacy PQ's three months ended March 31, 2016, \$(183) for legacy PQ's stub period from January 1, 2016 through May 3, 2016 and \$(1,291) and \$(2,215) for legacy PQ's years ended December 31, 2015 and 2014, respectively. The foreign currency impact attributable to our performance materials and chemicals segment was \$(881) for the six months ended June 30, 2016, \$(2,618) and \$(7,126) for the pro forma years ended December 31, 2016 and 2015, respectively, \$(1,655) for the year ended December 31, 2016, \$(432) for legacy PQ's three months ended March 31, 2016, \$(962) for legacy PQ's stub period from January 1, 2016 through May 3, 2016 and \$(7,126) and \$(27,364) for legacy PQ's years ended December 31, 2015 and 2014, respectively.
- (4) Our zeolite catalysts product group operates through our Zeolyst Joint Venture, which we account for as an equity method investment in accordance with GAAP. Total net sales represents 50% of the total net sales of our Zeolyst Joint Venture. We do not record sales by our Zeolyst Joint Venture as revenue and such sales are not consolidated within our results of operations. However, Adjusted EBITDA for the pro forma years ended December 31, 2016 and 2015 and for the six months ended June 30, 2017 reflects our share of the earnings of our Zeolyst Joint Venture that have been recorded as equity in net income from affiliated companies in our consolidated statements of operations for such periods and includes Zeolyst Joint Venture adjustments on a proportionate basis based on our 50% ownership interest. As a result, our Adjusted EBITDA margin for the pro forma years ended December 31, 2016 and 2015 and for the six months ended June 30, 2017, which was 30.0%, 29.2% and 31.0%, respectively, benefits from our share of the equity-method earnings of our Zeolyst Joint Venture in addition to certain adjustments, but does not reflect the sales of our Zeolyst Joint Venture for the respective periods. For the pro forma years ended December 31, 2016 and 2015 and for the six months ended June 30, 2017, our Adjusted EBITDA margin, including 50% of our Zeolyst Joint Venture's total net sales for such periods in the denominator, would have been 27.4%, 26.3% and 28.5%, respectively.

RISK FACTORS

An investment in our common stock involves risks. You should consider carefully the following risks and all of the other information contained in this prospectus before investing in our common stock. The risks described below are those that we believe are the material risks that we face. The trading price of our common stock could decline due to any of these risks, and you may lose all or part of your investment in our common stock. See "Cautionary Note Regarding Forward-Looking Statements" elsewhere in this prospectus.

Risks Related to Our Business

As a global business, we are exposed to local business risks in different countries, which could have a material adverse effect on our financial condition, results of operations and cash flows.

We have significant operations in many countries, including manufacturing sites, research and development facilities, sales personnel and customer support operations. As of June 30, 2017, we operated 72 manufacturing facilities across six continents. For the year ended December 31, 2016, our foreign subsidiaries accounted for 39% of our pro forma sales. Our operations are affected directly and indirectly by global regulatory, economic and political conditions, including:

- new and different legal and regulatory requirements in local jurisdictions;
- export duties or import quotas;
- domestic and foreign customs and tariffs or other trade barriers;
- potential difficulties in staffing and labor disputes;
- potential difficulties in managing and obtaining support and distribution for local operations;
- increased costs of, and availability of, raw materials, transportation or shipping;
- credit risk and financial condition of local customers and distributors;
- potential difficulties in protecting intellectual property rights;
- risk of nationalization of private enterprises by foreign governments;
- potential imposition of restrictions on investments;
- the imposition of withholding taxes or other taxes or royalties on our income, or the adoption of other restrictions on foreign trade or investment, including currency exchange controls;
- capital controls;
- potential difficulties in obtaining and enforcing legal judgments in jurisdictions outside the United States;
- potential difficulties in obtaining and enforcing relief in the United States against parties located outside the United States;
- potential difficulties in enforcing agreements and collecting receivables;
- risks relating to environmental, health and safety matters; and
- local political, economic and social conditions, including the possibility of hyperinflationary conditions and political instability in certain countries.

We may not be successful in developing and implementing policies and strategies to address the foregoing factors in a timely and effective manner at each location where we do business. Consequently, the occurrence of one or more of the foregoing factors could have a material adverse effect on our international operations or upon our financial condition, results of operations and cash flows.

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We are affected by general economic conditions and an economic downturn could adversely affect our operations and financial results.

We sell performance chemicals, performance materials and catalysts that are used in manufacturing processes and as components of, or ingredients in, other products and, as a result, our sales are correlated with and affected by fluctuations in the level of industrial production and manufacturing output and by fluctuations in general economic activity, including, for example, any potential impact of the vote by the United Kingdom to exit the European Union, commonly referred to as “Brexit.” Producers of performance chemicals, in particular, are likely to reduce their output in periods of significant contraction in industrial and consumer demand, while demand for the products we manufacture often depends on trends in demand in the end uses our customers serve. Our profit margins, as well as overall demand for our products, could decline as a result of factors outside our control, including economic recessions, changes in industrial production processes or consumer preferences, changes in laws and regulations affecting our industry and the manner in which they are enforced, inflation, fluctuations in interest and currency exchange rates and changes in the fiscal or monetary policies of governments in the regions in which we operate.

General economic conditions and macroeconomic trends could affect overall demand for our products and any overall decline in such demand could significantly reduce our sales and profitability. In addition, volatility and disruption in financial markets could adversely affect our sales and results of operations by limiting our customers’ ability to obtain the financing necessary to maintain or expand their own operations.

Exchange rate fluctuations could adversely affect our financial condition, results of operations and cash flows.

As a result of our international operations, for the year ended December 31, 2016, we generated 39% of our pro forma sales and incurred a significant portion of our expenses in currencies other than U.S. dollars. We incur currency transaction risk whenever we enter into either a purchase or sale transaction using a currency other than the local currency of the transacting entity. The main currencies to which we are exposed, besides the U.S. dollar, are the Euro, the British pound, the Canadian dollar, the Mexican peso and the Brazilian real. The exchange rates between these currencies and the U.S. dollar have fluctuated significantly in recent years and may continue to do so in the future. In many cases, we sell exclusively in those jurisdictions and do not have the ability to mitigate our exposure to currency fluctuations through our operations. Accordingly, to the extent that we are unable to match sales made in such foreign currencies with costs paid in the same currency, exchange rate fluctuations could adversely affect our financial condition, results of operations and cash flows. In the past, we have experienced economic loss and a negative impact on earnings as a result of foreign currency exchange rate fluctuations and any future fluctuations may have similar or greater impacts. We expect that the amount of our sales denominated in non-dollar currencies may increase in future periods. Given the volatility of exchange rates, there can be no assurance that we will be able to effectively manage our currency transaction risks or that any volatility in currency exchange rates will not have a material adverse effect on our financial condition or results of operations. See “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Quantitative and Qualitative Disclosures about Market Risk.”

Additionally, because our consolidated financial results are reported in U.S. dollars, the translation of sales or earnings generated in other currencies into U.S. dollars can result in a significant increase or decrease in the amount of those sales or earnings in our financial statements, which also affects the comparability of our results of operations and cash flows between financial periods. Further, currency fluctuations may negatively impact our debt service requirements, which are primarily in U.S. dollars.

Our international operations require us to comply with anti-corruption laws, trade and export controls and regulations of the U.S. government and various international jurisdictions in which we do business.

Doing business on a worldwide basis requires us and our subsidiaries to comply with the laws and regulations of the U.S. government and various international jurisdictions, and our failure to successfully comply

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with these laws and regulations may expose us to liabilities. Such laws and regulations apply to companies, individual directors, officers, employees and agents, and may restrict our operations, trade practices, investment decisions and partnering activities.

In particular, our international operations are subject to U.S. and foreign anti-corruption laws and regulations, such as the Foreign Corrupt Practices Act (“FCPA”) and the U.K. Bribery Act (“UKBA”). The FCPA prohibits us from providing anything of value to foreign officials for the purposes of influencing official decisions or obtaining or retaining business or otherwise obtaining favorable treatment, and requires us to maintain adequate record-keeping and internal accounting practices to accurately reflect our transactions. As part of our business, we may deal with state-owned business enterprises, the employees and representatives of which may be considered foreign officials for purposes of the FCPA and UKBA. In addition, some of the international locations in which we operate lack a developed legal system and have elevated levels of corruption. As a result of our international operations, we are exposed to the risk of violating anti-corruption laws.

In addition, we are subject to applicable export controls and economic sanctions laws and regulations imposed by the U.S. government and other countries. Changes in such laws and regulations may restrict our business practices, including cessation of business activities in sanctioned countries or regions or with sanctioned entities or individuals, and may result in modifications to compliance programs. Violations of these legal requirements are punishable by criminal fines and imprisonment, civil penalties, disgorgement of profits, injunctions, debarment from government contracts, loss of export privileges and other remedial measures.

We have established policies and procedures designed to assist us and our personnel in complying with applicable U.S. and international laws and regulations. These policies and procedures are codified in our Code of Conduct and other various policies. However, there can be no assurance that our policies and procedures will effectively prevent us from violating these laws and regulations in every transaction in which we may engage, and such a violation could subject us to governmental investigations and adversely affect our reputation, business, financial condition and results of operations.

Alternative technology or other changes in our customers’ products may reduce or eliminate the need for certain of our products.

Many of the products that we sell are used in manufacturing processes and as components of or ingredients in other products and, as a result, changes in our customers’ end products or processes or alternative technology may enable our customers to reduce or eliminate consumption or use of our products. For example, over the last seven years, customers in the detergent industry have significantly reduced their use of zeolites. Additionally, shifting consumer preference could result in a significant reduction in the future use of fossil fuels, which would have a negative impact on our zeolite catalysts and refining services. If we are unable to respond appropriately to such new developments, such changes could seriously impair our ability to profitably market certain of our products.

Our new product development and research and development efforts may not succeed and our competitors may develop more effective or successful products.

The industries in which we operate are subject to periodic technological changes and ongoing product improvements. In order to maintain our margins and remain competitive, we must successfully develop, manufacture and market new or improved products. As a result, we must commit substantial resources each year to new product research and development. Ongoing investments in new product research and development could result in higher costs without a proportional increase in revenues. Additionally, for any new product program, there is a risk of technical or market failure, in which case we may need to commit additional resources to the program and may not be able to develop the new products needed to maintain our competitive position. Moreover, new products may have lower margins than the products they replace or may not successfully attract end users.

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We also expect competition to increase as our competitors develop and introduce new and enhanced products. As such products are introduced, our products may become obsolete or our competitors' products may be marketed more effectively. If we fail to develop new products, maintain or improve our margins with our new products or keep pace with technological developments, our business, financial condition, results of operations and cash flows will suffer.

Our substantial level of indebtedness could adversely affect our financial condition.

We have substantial indebtedness, which, as of June 30, 2017, totaled approximately \$2,728.4 million. We intend to use the net proceeds from this offering primarily to repay a portion of our indebtedness. See "Use of Proceeds." Our substantial indebtedness, combined with our other financial obligations and contractual commitments, could have important consequences, including:

- requiring us to dedicate a substantial portion of our cash flows from operations to payments on our indebtedness, thereby reducing funds available for working capital, capital expenditures, acquisitions, selling and marketing efforts, product development and other purposes;
- increasing our vulnerability to adverse economic and industry conditions, which could place us at a competitive disadvantage compared to our competitors that have relatively less indebtedness;
- limiting our flexibility in planning for, or reacting to, changes in our business and the industries in which we operate;
- increasing our exposure to rising interest rates because certain of our borrowings are at variable interest rates;
- restricting us from making strategic acquisitions or causing us to make non-strategic divestitures; and
- limiting our ability to borrow additional funds, or to dispose of assets to raise funds, if needed, for working capital, capital expenditures, acquisitions, product development and other corporate purposes.

Although the terms of the agreements governing our outstanding indebtedness contain restrictions on the incurrence of additional indebtedness, such restrictions are subject to a number of important exceptions and indebtedness incurred in compliance with such restrictions could be substantial. If we and our restricted subsidiaries incur significant additional indebtedness, the related risks that we face could increase.

If we are unable to pass on increases in raw material prices, including natural gas, to our customers or to retain or replace our key suppliers, our results of operations and cash flows may be negatively affected.

We purchase significant amounts of raw materials, including soda ash, cullet, industrial sand, aluminum trihydrate, sodium hydroxide (commonly known as caustic soda) and sulfur (including hydrogen sulfite), in our performance chemicals, performance materials and refining services product groups, and we purchase significant amounts of natural gas to supply the energy required in our production process. The cost of these raw materials represents a substantial portion of our operating expenses and our results of operations have been, and could in the future be, significantly affected by increases in the costs of such raw materials. In addition, we obtain a significant portion of our raw materials from certain key suppliers. If any of those suppliers is unable to meet its obligations under current supply agreements, we may be forced to pay higher prices to obtain the necessary raw materials. Furthermore, if any of the raw materials that we use become unavailable within the geographic area from which we currently source them, we may not be able to obtain suitable and cost-effective substitutes. Any interruption of supply or any price increase of raw materials could adversely affect our profitability.

While we attempt to match raw material price increases with corresponding product price increases, our ability to pass on increases in the cost of raw materials to our customers is, to a large extent, dependent upon our contractual arrangements and market conditions. There may be periods of time during which we are not able to recover increases in the cost of raw materials due to our contractual arrangements or weakness in demand for, or

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oversupply of, our products. Specifically, timing differences between price adjustments of raw materials, which may occur daily, and adjustments to our product prices, which in many cases are adjusted quarterly or less often, have had and may continue to have a negative effect on our profitability. Even in periods during which raw material prices decline, we may suffer decreasing profits if customers seek relief in the form of lower sales prices or if the raw material price reductions occur at a slower rate than decreases in the selling prices of our products. Furthermore, some of our performance chemicals customers may take advantage of fluctuating prices by building inventories when they expect product prices to increase and reducing inventories when they expect product prices to decrease. Such volatility can result in commercial disputes with customers and suppliers with respect to interpretations of complex contractual arrangements, the adverse resolution of which could reduce our profitability.

In the past, we have entered into long-term supply contracts for certain of our raw materials, including for certain of our North American soda ash. As these contracts expire, we may not be able to renegotiate or enter into new long-term supply contracts that will offer similar protection from price increases and other fluctuations on terms that are satisfactory to us or at all.

In addition, we have attempted to mitigate our exposure to the significant price volatility of natural gas, which has historically had a negative impact on our results of operations, by implementing a hedging program in the United States and entering into forward purchases in the United States, Canada, Europe and other parts of the world. Our hedging strategy may not be successful and if energy prices rise, our profitability could be adversely affected. With the exception of such natural gas contracts, we typically do not enter into long-term forward contracts to hedge against raw material price volatility.

We face substantial competition in the industries in which we operate.

The industries in which we operate are highly competitive and we face significant competition from large international producers and, particularly in Europe and certain Asia-Pacific regions, smaller regional competitors. Our silica catalysts and zeolite catalysts primarily compete with other global producers in the petrochemicals and refining industries such as W.R. Grace, BASF, UOP, and Albemarle, as well as other niche competitors such as Tosoh, Axens, and Haldor Topsoe. We compete in the North American refining services industry with competitors such as Chemtrade and Veolia through our refining services product group. Additionally, our performance materials and chemicals business primarily competes with other global producers such as OxyChem, PPG and Evonik. We believe that we typically compete on the basis of performance, product consistency, quality, reliability, and ability to innovate in response to customer demands.

Our competitors may improve their competitive position in our core end use applications by successfully introducing new products, improving their manufacturing processes, expanding their capacity or manufacturing facilities or responding more effectively than us to new or emerging technologies and changes in customer requirements. Some of our competitors may be able to lower prices for our products if their costs are lower. In addition, consolidation among our competitors or customers may result in reduced demand for our products or make it more difficult for us to compete. Some of our competitors' financial, technological and other resources may be greater than ours or they may have less debt than we do and, as a result, may be better able to withstand changes to industry conditions. The occurrence of any of these events could materially adversely affect our financial condition and results of operations.

We are subject to the risk of loss resulting from non-payment or non-performance by our customers.

Our credit procedures and policies may not be adequate to minimize or mitigate customer credit risk. Our customers may experience financial difficulties, including bankruptcies, restructurings and liquidations. These and other financial problems our customers may experience, as well as potential financial weakness in the industries in which we operate, may increase our risk in extending trade credit to customers. A significant adverse change in a customer's financial position could cause us to limit or discontinue business with such

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customer, require us to assume more credit risk relating to such customer's receivables or limit our ability to collect accounts receivable from such customer, any of which could have a material adverse effect on our business, results of operations, financial condition and liquidity.

We rely on a limited number of customers for a meaningful portion of our business. A loss of one or more of these customers could adversely impact our profitability.

A loss of any significant customer, including a pipeline customer, or a decrease in the provision of products to any significant customer could have an adverse effect on our business until alternative arrangements are secured. Any alternative arrangement to replace the loss of a customer would result in increased variable costs relating to product shipment. In addition, any new customer agreement entered into by us may not have terms as favorable as those contained in our current customer agreements, which could have a material adverse effect on our business, financial condition and results of operations. For the year ended December 31, 2016 our top 10 customers represented approximately 24% of our pro forma sales and no single customer represented more than 4% of our pro forma sales.

Refineries, which represent a sizeable subset of our environmental catalysts and services business customers, have undergone significant consolidation and additional consolidation is possible in the future. Such consolidation could further increase our reliance on a small number of customers and further increase our customers' leverage over us, resulting in downward pressure on prices and an adverse effect on our profitability.

Multi-year customer contracts in our refining services product group are subject to potential early termination and such contracts may not be renewed at the end of their respective terms.

Many of the customer contracts in our refining services product group are multi-year agreements. Sulfuric acid regeneration customer contracts are typically on five- to ten-year terms and virgin sulfuric acid customer contracts are typically on one- to five-year terms, with larger customers typically favoring longer terms. Excluding contracts with automatic evergreen provisions, approximately 60% of our sulfuric acid volume for the year ended December 31, 2016 was under contracts expiring at the end of 2019 or beyond. In addition, our sulfuric acid regeneration contracts with major refinery customers typically allow for termination with advance notice of one to two years. We cannot provide assurance that our existing contracts will not be subjected to early terminations or that our expiring contracts will be renewed at the end of their terms. If we receive a significant number of such contract terminations or experience non-renewals from key customers in our refining services product group, our results of operations, financial condition and cash flows may be materially adversely affected.

Reductions in highway safety spending or taxes earmarked for highway safety spending could result in a decline in our sales.

Approximately 13% of our pro forma sales for the year ended December 31, 2016 were derived from products sold into highway safety applications. Sales of our performance materials products for highway safety uses are in part dependent upon federal, state, local and foreign government budgets. A decrease in, or termination of, governmental budgeting for new highway safety programs or a significant decrease in the use of our performance materials products in any new highway safety projects could have an adverse effect on our business, financial condition, results of operations or cash flows by decreasing the profitability of our performance materials product group.

Our quarterly results of operations are subject to fluctuations because the demand for some of our products is seasonal.

Seasonal changes and weather conditions typically affect our performance materials and refining services product groups. In particular, our performance materials product group generally experiences lower sales and profit in the first and fourth quarters of the year because highway striping projects typically occur during warmer

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weather months. Additionally, our 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, our working capital requirements tend to be higher in the first and fourth quarters of the year, which can adversely affect our liquidity and cash flows. Because of this seasonality associated with certain of our product groups, results for any one quarter are not necessarily indicative of the results that may be achieved for any other quarter or for the full year.

If we lose certain key personnel or are unable to hire additional qualified personnel, we may not be able to execute our business strategy and our business could be adversely affected.

Our success depends, in part, upon the continued services of our highly skilled personnel involved in management, research, production and distribution and, in particular, upon the efforts and abilities of our key officers. Although we believe that we are adequately staffed in key positions, we may not be able to retain such personnel on acceptable terms or at all, and such personnel may seek to compete with us in the future. If we lose the service of any of our key personnel, we may not be able to hire replacements with the same level of industry experience and knowledge necessary to execute our business strategy, which in turn could have a material adverse effect on our business, financial condition, results of operations or cash flows.

Our expansion projects may result in significant expenditures before generating revenues, if any, which may materially and adversely affect our ability to implement our business strategy.

We have made and continue to make significant investments in each of our businesses. These projects require us to commit significant capital to, among other things, implement engineering plans and obtain the necessary permits before we generate revenues related to our investments in these businesses. Such projects may take longer to complete or require additional unanticipated expenditures and may never generate profits. If we fail to recover our investment, or these projects never become profitable, our ability to implement our business strategy may be materially and adversely affected.

We may be liable for damages based on product liability claims brought against us or our customers for costs associated with recalls of our or our customers' products.

Even though we are generally a materials and services supplier rather than a manufacturer of finished goods, the sale of our products involves the risk of product liability claims and voluntary or government-ordered product recalls. For example, certain of the products that we manufacture provide critical performance functions to our customers' end products, are used in and around other chemical manufacturing facilities, highways, airports and other locations where personal injury or property damage may occur or are used in certain consumer goods such as beverages, personal care products and medicinal applications. While we attempt to protect ourselves from product liability claims and exposures through our adherence to standards and specifications and through contractual negotiations, there can be no assurance that our efforts will ultimately protect us from any such claims. A product liability claim or voluntary or government-ordered product recall could result in substantial and unexpected expenditures, affect consumer or customer confidence in our products and divert management's attention from other responsibilities. A product recall or successful product liability claim or series of claims against us in excess of our insurance coverage and for which we are not otherwise indemnified could have a material adverse effect on our business, financial condition, results of operations or cash flows.

We are required to comply with a wide variety of laws and regulations, and are subject to regulation by various federal, state and foreign agencies, and our failure to comply with existing and future regulatory requirements could adversely affect our financial condition, results of operations and cash flows.

We compete in industries in which we and our customers are subject to federal, state, local, international and transnational laws and regulations. Such laws and regulations are numerous and sometimes conflicting, and

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any future changes to such laws and regulations could adversely affect us. For example, our performance materials product group sells products used in highway safety applications, and such products are subject to laws and regulations that vary by state. If we fail to comply with applicable laws and regulations, we may be subject to civil remedies, including fines, injunctions, recalls or seizures, any of which could have an adverse effect on our business, financial condition and results of operations.

In order to obtain regulatory approval for certain of our new products, we must, among other things, demonstrate to the relevant authority that the product is safe and effective for its intended uses and that we are capable of manufacturing the product in accordance with current regulations. The process of seeking approvals can be costly, time-consuming and subject to unanticipated and significant delays. Any delay in obtaining, or any failure to obtain or maintain, these approvals would adversely affect our ability to introduce new products and to generate sales from those products, and could have an adverse effect on our business, financial condition, results of operations or cash flows.

Our products, including the raw materials we handle, are subject to rigorous chemical registration and industrial hygiene regulations and investigation. There is risk that a key raw material, chemical or substance, or one of the end products of which our products are a part, may be recharacterized as having a toxicological or health-related impact on the environment, our customers or our employees. Industrial hygiene regulations are continually strengthened and if such recharacterization occurred, the relevant raw material, chemical or product may be banned or we may incur increased costs in order to comply with new requirements. Changes in industrial hygiene regulations also affect the marketability of certain of our products, and future regulatory changes may have a material adverse effect on our business.

New laws and regulations, and changes in existing laws and regulations, may be introduced in the future and could prevent or inhibit the development, distribution and sale of our products, including as a result of additional compliance costs, seizures, confiscation, recall or monetary fines. For example, as discussed in more detail in “Business—Environmental Regulations” and “Business—Chemical Product Regulation,” we may be materially impacted by regulatory initiatives worldwide with respect to chemical product safety such as the 2016 amendments to the U.S. Toxic Substances Control Act, the E.U. regulation “Registration, Evaluation, Authorisation and Restriction of Chemical Substances” (“REACH”), or similar regulations being enacted in other countries (e.g., China REACH; Korea REACH). Additionally, the current U.S. administration may seek to reduce current environmental standards and regulations, such as the Corporate Average Fuel Economy standards, which could have a material adverse effect on our sales into the fuels and emissions controls industries.

We are subject to extensive environmental, health and safety regulations and face various risks associated with potential non-compliance or releases of hazardous materials.

Like other chemical companies, our operations and properties are subject to extensive and stringent federal, state, local and foreign environmental laws and regulations. U.S. federal environmental laws that affect us include the Resource Conservation and Recovery Act (“RCRA”), the Clean Air Act, the Clean Water Act and the Comprehensive Environmental Response Compensation and Liability Act (“CERCLA”). These laws govern, among other things, emissions to the air, discharges or releases of hazardous substances to land, surface, subsurface strata and water, wastewater discharges and the generation, handling, storage, transportation, treatment, disposal and remediation of hazardous materials and petroleum products. We are also subject to other federal, state, local and foreign laws and regulations regarding chemical and product safety as well as employee health and safety matters, including process safety requirements. These laws and regulations may become more stringent over time and the failure to comply with such laws and regulations can result in significant fines or penalties.

We have in the past been and currently are the subject of investigations and enforcement actions pursuant to environmental laws, including the Clean Air Act. Some of these matters were resolved through the payment of significant monetary penalties and a requirement to implement corrective actions at our facilities. For instance, in

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November 2015, the Pennsylvania Department of Environmental Protection issued a \$1.7 million fine against us for allegedly excessive emissions of carbon monoxide and nitrogen oxides from our Chester, Pennsylvania site. We have appealed the alleged violations and the associated fine. We also remain subject to a 2007 Consent Decree that resolves certain alleged Clean Air Act violations at our seven refining services operating locations involving New Source Review, Prevention of Significant Deterioration and New Source Performance Standard obligations under the U.S. federal rules for the pollutants sulfur dioxide and sulfuric acid mist. The Consent Decree required Solvay (the owner at the time) to pay a \$2 million penalty and spend approximately \$34 million on air pollution controls at our facilities, the majority of which was received from customers in contractual arrangements. Work under the Consent Decree has proceeded since 2007, and we believe that all of the significant capital improvements related to the Consent Decree have been completed. One of our operating locations has been released from the scope of the Consent Decree and we are seeking release of the other locations covered by the Consent Decree.

We are required by these environmental laws and regulations to obtain registrations, licenses, permits and other approvals in order to operate, to make disclosures to public authorities about our chemical handling and usage activities and to install expensive pollution control and spill containment equipment at our facilities, or to incur other capital expenditures aimed at achieving or maintaining compliance with such laws and regulations. We are preparing to implement a substantial environmentally-driven capital improvement project over the next three years and failure to complete this project or to timely identify and implement other capital projects required to achieve or maintain compliance could expose us to enforcement and penalty.

Under CERCLA and analogous statutes in local and foreign jurisdictions, current and former owners and operators of land impacted by releases of hazardous substances are strictly liable for the investigation and remediation of the contamination resulting from the release. Liability under CERCLA and analogous laws is strict, unlimited, joint, several and retroactive, may be imposed regardless of fault and may relate to historical activities or contamination not caused by the affected property's current owner or operator. We could be held responsible for all cleanup costs at a site, whether currently or formerly owned or operated, regardless of fault, knowledge, timing or cause of the contamination. Further, under CERCLA and analogous laws, we may be jointly and severally liable for contamination at third party sites where we or our predecessors in interest have sent waste for treatment or disposal, even if we complied with applicable laws. In addition, we may face liability for personal injury, property damage and natural resource damage resulting from environmental conditions attributable to hazardous substance releases at or from facilities we currently or formerly owned or operated or to which we sent waste. As such, a product spill or emission at one of our facilities or otherwise resulting from our operations could have adverse consequences on the environment and surrounding community and could result in significant liabilities with respect to investigation and remediation.

Our facilities have an extended history of industrial use, and soil and groundwater contamination exists at some of our sites. As of June 30, 2017, we had current investigation, remediation or monitoring obligations at several of our current or former sites, including Rahway, New Jersey; Dominguez, California; Martinez, California; and Tacoma, Washington. As of June 30, 2017, we had established reserves of approximately \$5.1 million to cover anticipated expenses at these sites, all of which have reached relatively mature stages of either the investigation, remediation or monitoring process. Actual costs to complete these projects may exceed our current estimates. In addition, we have unresolved liability at several sites to which we or our predecessors allegedly arranged for the disposal or treatment of hazardous wastes. For example, at the Boyertown Sanitary Disposal site in Gilbertsville, Pennsylvania, we are participating in a group of parties who disposed of materials at the site to fund investigatory and remedial work.

As of June 30, 2017, our total reserves associated with environmental remediation and enforcement matters were \$7.6 million. In addition to the ongoing remediation and monitoring activities discussed above, there is risk that the long-term industrial use at our facilities may have resulted in, or may in the future result in, contamination that has yet to be discovered, which could require additional, unplanned investigation and remediation efforts by us for which no reserves have been established, potentially without regard to whether we

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knew of, or caused, the release of such hazardous substances. Discovery of additional or unknown conditions at our facilities could have an adverse impact on our business by substantially increasing our capital expenditures, including compliance, investigation and remediation costs. Such environmental liabilities attached to our properties, or for properties that we are otherwise responsible for, could have a material adverse effect on our results of operations or financial condition.

Existing and proposed regulations to address climate change by limiting greenhouse gas emissions may cause us to incur significant additional operating and capital expenses.

Certain of our operations result in emissions of greenhouse gases (“GHGs”), such as carbon dioxide. Growing concern about the sources and impacts of global climate change has led to a number of domestic and foreign legislative and administrative measures, both proposed and enacted, to monitor, regulate and limit carbon dioxide and other GHG emissions. In the European Union, our emissions are regulated under the E.U. Emissions Trading System (the “E.U. ETS”), an E.U.-wide trading scheme for industrial GHG emissions. The E.U. ETS is anticipated to become progressively more stringent over time, including by reducing the number of allowances to emit GHGs that E.U. member states will allocate without charge to industrial facilities. In the United States, the EPA has promulgated federal GHG regulations under the Clean Air Act that affect certain sources. For example, the EPA has issued mandatory GHG reporting requirements, under which our Dominguez, California and Baton Rouge, Louisiana facilities currently report. Moreover, California has enacted the Global Warming Solutions Act of 2006 (“Assembly Bill 32”), a law that establishes a comprehensive program to reduce GHG emissions from all sources throughout the state and contains reporting requirements under which our Dominguez and Martinez facilities currently report. Our Dominguez facility also participates in the emissions trading market established under Assembly Bill 32. Although we believe it is likely that GHG emissions will continue to be regulated in at least some regions of the United States and in other countries (in addition to the European Union) in the future, we cannot yet predict the form such regulation will take (such as a cap-and-trade program, technology mandate, emissions tax or other regulatory mechanism) or, consequently, estimate any costs that we may be required to incur in respect of such requirements, which could, for example, require that we install emissions control equipment, purchase emissions allowances, administer and manage our GHG emissions program or address other regulatory obligations. Such requirements could also adversely affect our energy supply or the costs and types of raw materials that we use for fuel. Accordingly, regulations controlling or limiting GHG emissions could have a material adverse effect on our business, financial condition or results of operations, including by reducing demand for our products.

Production and distribution of our products could be disrupted for a variety of reasons, and such disruptions could expose us to significant losses or liabilities.

Certain of the hazards and risks associated with our manufacturing processes and the related storage and transportation of raw materials, products and wastes may disrupt production at our manufacturing facilities and the distribution of products to our customers. These potentially disruptive risks include, but are not limited to, the following:

- pipeline and storage tank leaks and ruptures;
- explosions and fires;
- inclement weather and natural disasters;
- terrorist attacks;
- failure of mechanical, process safety and pollution control equipment;
- chemical spills and other discharges or releases of toxic or hazardous substances or gases; and
- exposure to toxic chemicals.

These hazards could expose employees, customers, the community and others to toxic chemicals and other hazards, contaminate the environment, damage property, result in personal injury or death, lead to an interruption

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or suspension of operations, damage our reputation and adversely affect the productivity and profitability of a particular manufacturing facility or our business as a whole. Such hazards could also result in the need for remediation, governmental enforcement, regulatory shutdowns, the imposition of government fines and penalties and claims brought by governmental entities or third parties. Legal claims and regulatory actions could subject us to both civil and criminal penalties, which could affect our product sales, reputation and profitability.

If disruptions at our manufacturing facilities or in our distribution channels occur, alternative options with sufficient capacity or capabilities may not be available, may cost substantially more or may require significant time to start production or distribution. Any of these scenarios could negatively affect our business and financial performance. If one of our manufacturing facilities or distribution channels is unable to produce or distribute our products for an extended period of time, our sales may be reduced by the shortfall caused by the disruption and we may not be able to meet our customers' needs, which could cause them to seek other suppliers. Furthermore, to the extent a production disruption occurs at a manufacturing facility that has been operating at or near full capacity, the resulting shortage of our product could be particularly harmful because production at the manufacturing facility may not be able to reach levels achieved prior to the disruption. Such risks are heightened in our refining services product group, which has operations and customers primarily located in the Gulf Coast, which is susceptible to a heightened risk of hurricanes, and Northern California, which is susceptible to a heightened risk of earthquakes.

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

We maintain property, business interruption, casualty and other types of insurance, but such insurance may not cover all risks associated with the operation of our business or our manufacturing process and the related use, storage and transportation of raw materials, products and wastes in or from our manufacturing sites or distribution centers. While we have purchased what we deem to be adequate limits of coverage and broadly worded policies, our coverage is subject to exclusions and limitations, including higher self-insured retentions or deductibles and maximum limits and liabilities covered. Notwithstanding diligent efforts to successfully procure specialty coverage for environmental liability and remediation, we may incur losses beyond the limits or outside the terms of coverage of our insurance policies, including liabilities for environmental remediation. In addition, from time to time, various types of insurance for companies in the industries in which we operate have not been available on commercially acceptable terms or, in some cases, at all. We are potentially at additional risk if one or more of our insurance carriers fail. Additionally, severe disruptions in the domestic and global financial markets could adversely impact the ratings and survival of some insurers. Future downgrades in the ratings of enough insurers could adversely impact both the availability of appropriate insurance coverage and its cost. In the future, we may not be able to obtain coverage at current levels, if at all, and our premiums may increase significantly on coverage that we maintain.

We could be subject to damages based on claims brought against us by our customers or lose customers as a result of the failure of our products to meet certain quality specifications.

Our products provide important performance attributes to our customers' products. If a product fails to perform in a manner consistent with quality specifications, or has a shorter useful life than that which was guaranteed, a customer could seek replacement of the product or damages for costs incurred as a result of the product failing to perform as guaranteed. A successful claim or series of claims against us could cause reputational harm and have a material adverse effect on our financial condition and results of operations and could result in a loss of one or more customers.

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We may engage in strategic acquisitions or dispositions of certain assets or businesses that could affect our business, results of operations, financial condition and liquidity.

We may selectively pursue complementary acquisitions, such as the Business Combination, and joint ventures, such as our Zeolyst Joint Venture, each of which inherently involves a number of risks and presents financial, managerial and operational challenges, including:

- potential disruption of our ongoing business and distraction of management;
- difficulty with integration of personnel and financial and other systems;
- hiring additional management and other critical personnel; and
- increasing the scope, geographic diversity and complexity of our operations.

In addition, we may encounter unforeseen obstacles or costs in the integration of acquired businesses. For example, the presence of one or more material liabilities of an acquired company that are unknown to us at the time of acquisition may have a material adverse effect on our business. Our acquisition and joint venture strategy may not be received positively by customers, and we may not realize any anticipated benefits from acquisitions or joint ventures.

We may also opportunistically pursue dispositions of certain assets and businesses, which may involve material amounts of assets or lines of business, and could adversely affect our results of operations, financial condition and liquidity. If any such dispositions were to occur, under the terms of the agreements governing our outstanding indebtedness, we may be required to apply the proceeds of the sale to repay such indebtedness.

The pro forma and non-GAAP financial information included in this prospectus is presented for informational purposes only and may not be an indication of our financial condition or results of operations in the future.

The unaudited pro forma combined financial information included in this prospectus is presented for informational purposes only and is not necessarily indicative of what our actual financial condition or results of operations would have been had the Business Combination been completed on the date indicated. The assumptions used in preparing the pro forma financial information may not prove to be accurate and other factors may affect our financial condition or results of operations. Accordingly, our financial condition and results of operations in the future may not be consistent with, or evident from, such pro forma financial information. The non-GAAP financial information included in this prospectus includes information that we use to evaluate our past performance, but you should not consider such information in isolation or as an alternative to measures of our performance determined under GAAP. For further information regarding such limitations, see “Summary Historical and Unaudited Pro Forma Financial and Other Data.”

Our joint ventures may not operate according to their business plans if our partners fail to fulfill their obligations or differences in views among our partners results in delayed decisions or failures to agree on major issues, which may adversely affect our results of operations and force us to dedicate additional resources to these joint ventures.

We currently participate in a number of joint ventures and may enter into additional joint ventures in the future. The nature of a joint venture requires us to share control with unaffiliated third parties and we sometimes have joint and several liability with our joint venture partners. If our joint venture partners do not fulfill their obligations, or if differences in views among the joint venture participants results in delayed decisions or failures to agree on major issues, the affected joint venture may not be able to operate according to its business plan. For example, our Zeolyst Joint Venture is structured as a general partnership in which we are equal partners with CRI Zeolites Inc. Accordingly, we do not control the Zeolyst Joint Venture and cannot unilaterally undertake strategies, plans, goals and operations or determine when cash distributions will be made to us. Furthermore, we are liable on a joint and several basis with CRI Zeolites Inc. for all of the partnership’s liabilities if it does not

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have sufficient assets to satisfy such liabilities. Such factors may adversely affect our results of operation and force us to dedicate additional and unexpected resources to our joint ventures.

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

Protection of our proprietary processes, methods, compounds and other technologies is important to our business. We depend upon our ability to develop and protect our intellectual property rights to distinguish our products from those of our competitors. Failure to protect our existing intellectual property rights may allow our competitors to copy our products and may result in the loss of valuable proprietary technologies or other intellectual property. Failure to protect our innovations and trademarks by securing intellectual property rights could also result in our having to pay other companies for infringing on their intellectual property rights. We rely on a combination of patent, trade secret, trademark and copyright law as well as regulatory and judicial enforcement to protect such technologies and trademarks. In addition, the laws of many foreign countries do not protect our intellectual property rights to the same extent as the laws of the United States. As of June 30, 2017, we owned 47 patented inventions in the United States, with approximately 300 patents issued in countries around the world and approximately 140 patent applications pending worldwide covering more than 25 additional inventions. Some of these patents are licensed to others. In addition, we have acquired certain rights under patents and inventions of others through licenses. Should any of these licenses granted to us by third parties terminate prior to the expiration of the licensed intellectual property, we would need to cease using the licensed intellectual property, and either develop or license alternative technologies. In such a case, there can be no assurance that alternative technologies exist or that we would be able to obtain such a license on favorable terms.

Competitors and third parties may infringe on our patents or violate our intellectual property rights. Defending and enforcing our intellectual property rights can involve litigation and can be expensive and time consuming. Such proceedings could put our patents at risk of being invalidated and confidential information may be disclosed through the discovery process; these costs and diversion of resources could harm our business.

We cannot provide any assurances that any of our pending applications will mature into issued patents, or that any patents that have issued or may issue in the future do or will include claims with a scope sufficient to provide any competitive advantage. Patents involve complex legal and factual questions and, therefore, the issuance, scope, validity and enforceability of any patent claims we have or may obtain cannot be predicted with certainty. Patents may be challenged, deemed unenforceable, invalidated or circumvented. Patents may be challenged in the courts, as well as in various administrative proceedings before the United States Patent and Trademark Office or foreign patent offices. We are currently and may in the future be a party to various adversarial patent office proceedings involving our patents or the patents of third parties. Such challenges can result in some or all of the claims of the challenged patent being invalidated, deemed unenforceable, or interpreted narrowly which, in the case of challenges to our own patents, may be adverse to our interests. Accordingly, the issuance of patents is not conclusive of the validity, scope, or enforceability of such patents. Moreover, even if valid and enforceable, competitors may be able to design around our patents or use pre-existing technologies to compete with us.

We also rely upon unpatented proprietary know-how, continuing technological innovation and other trade secrets to develop and maintain our competitive position, which may not provide us with complete protection against competitors. Misappropriation or unauthorized disclosure of our proprietary know-how could harm our competitive position or have an adverse effect on our business. While it is our policy to enter into confidentiality agreements with our employees and third parties to protect our intellectual property rights and we strive to maintain the physical security of our properties and the security of our IT systems, there can be no assurances that:

- our confidentiality agreements will not be breached;
- our security measures will not be breached;
- such agreements will provide meaningful protection for our trade secrets or proprietary know-how; or

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- adequate remedies will be available in the event of an unauthorized use or disclosure of such trade secrets and know-how.

In addition, there can be no assurances that others will not obtain knowledge of these trade secrets through independent development or other access by legal means.

Measures taken by us to protect these assets and rights may not provide meaningful protection for our trade secrets or proprietary manufacturing expertise and adequate remedies may not be available in the event of an unauthorized use or disclosure of our trade secrets or manufacturing expertise. In addition, as noted above, our patents and other intellectual property rights may be challenged, invalidated, circumvented or rendered unenforceable.

Furthermore, we cannot provide assurance that any pending patent or trademark application filed by us will result in an issued patent or registered trademark or, if patents are issued to us, that those patents will provide meaningful protection against competitors or against competitive technologies. The failure of our patents or other measures to protect our processes, apparatuses, technology, trade secrets and proprietary manufacturing expertise, methods and compounds or trademarks and provide us with freedom to exclude competition could have an adverse effect on our business, financial condition, results of operations and cash flows. See “Business—Intellectual Property.”

Our products may infringe the intellectual property rights of others, which may cause us to incur unexpected costs or prevent us from selling our products.

Our industry is characterized by vigilant pursuit of intellectual property rights, particularly with respect to our silica catalysts and zeolite catalysts product groups. Like us, our competitors rely on intellectual property rights to maintain profitability and competitiveness. As the number of products and competitors has increased, the likelihood of intellectual property disputes has risen. Although it is our policy and intention not to infringe valid patents of which we are aware, our processes, apparatuses, technology, proprietary manufacturing expertise, methods, compounds and products may infringe on issued patents or infringe or misappropriate other intellectual property rights of others. Accordingly, we continually monitor third-party intellectual property to confirm our freedom to operate. Nevertheless, we may be subject to legal proceedings and claims in the ordinary course of our business, including claims of alleged infringement of the patents or trademarks or infringement or misappropriation of other intellectual property rights of third parties by us or our licensees in connection with their use of our products. Intellectual property litigation is expensive and time-consuming, regardless of the merits of any claim, and could divert the attention of our management and technical personnel away from operating our business. If we were to discover that our processes, apparatuses, technology, products or trademarks infringe the valid intellectual property rights of others, we might need to obtain licenses from these parties or substantially reengineer or rebrand our products in order to avoid infringement. We may not be able to obtain the necessary licenses on acceptable terms, or at all, or be able to reengineer our products successfully or at an acceptable cost. Moreover, if we are sued for infringement and lose the suit, we could be required to pay substantial damages and/or be enjoined from using or selling the infringing products or technology or using the infringing trademark. Additionally or alternatively, we may seek to challenge third-party patents in administrative proceedings before the United States patent office or one or more foreign patent offices. Any of the foregoing could cause us to incur significant costs and prevent us from selling our products, which could have an adverse effect on our business, financial condition, results of operations and cash flows. Even if we ultimately prevail, the existence of lawsuits could prompt our customers to switch to alternative products. In addition, we have agreed, and will continue to agree, to indemnify certain customers for certain intellectual property infringement claims related to intellectual property relating to our products and the manufacture thereof. Should there be infringement claims against our licensees, we could be required to indemnify them for losses resulting from such claims or to refund amounts they have paid to us.

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Losses and damages in connection with information technology risks could adversely affect our operations.

Our operations materially depend on the reliable performance of a complex, worldwide and highly available information technology infrastructure with integrated processes. The networks and data centers we use are subject to damage by material events such as major disruptions to public infrastructure, including power outages, cyber or terrorist attacks, viruses, physical or electronic break-ins and fires. Despite various disaster recovery plans, there can be no assurance that our systems are appropriately redundant and we do not control the operations at the back-up facility we use. Accordingly, such an event could cause material disruptions in our operations.

The broad use of information technology systems has increased the risk of unauthorized access to confidential data, such as customer information, strategic projects, product formulas and other trade secrets, and the risk of destruction or manipulation of material data by employees or third parties. Release of third party confidential information could materially harm our reputation, affect our relationships with such parties and expose us to liability. Although we have introduced many security measures, including firewalls and information technology security policies, we cannot ensure that these measures offer the appropriate level of security. A security breach or other compromise of our information security safeguards could expose our confidential information, including third party confidential information in our possession (such as customer information) to theft and misuse, which could in turn adversely affect our relationships with such third parties and have an adverse effect on our business, financial condition, results of operations and cash flows.

We depend on good relations with our workforce, and any significant disruptions could adversely affect our operations.

As of December 31, 2016, we had 2,949 employees globally, approximately 49% of which were represented by a union, works council or other employee representative body. As of December 31, 2016, approximately 66% of our U.S. unionized employees were covered under collective bargaining agreements that will expire on or before December 31, 2018. Failure to reach agreement with any of our unionized work groups regarding the terms of their collective bargaining agreements or annual pay increases may result in a labor strike, work stoppage or slowdown. In addition, a large number of our employees are employed in countries in which employment laws provide greater bargaining or other rights to employees than the laws of the United States. Such employment rights require us to work collaboratively with the legal representatives of the employees to effect any changes to labor arrangements. For example, many of our employees in Europe are represented by works councils that must approve any changes in conditions of employment, including salaries, benefits and staff changes, and may impede efforts to restructure our workforce. Although we believe that we have a good working relationship with our employees, a strike, work stoppage or slowdown by our employees or a dispute with our employees could result in a significant disruption to our operations or higher ongoing labor costs. In addition, our ability to make adjustments to control compensation and benefits costs, or otherwise adapt to changing business needs, may be limited by the terms and duration of our collective bargaining agreements.

We are subject to certain risks related to litigation filed by or against us, as well as administrative and regulatory proceedings, and adverse results may harm our business.

We cannot predict with certainty the cost of defense, the cost of prosecution or the ultimate outcome of litigation and other administrative and regulatory proceedings filed by or against us, including remedies or damage awards, and adverse results in any litigation or other administrative and regulatory proceedings may materially harm our business. Litigation and other administrative and regulatory proceedings may include, but are not limited to, actions relating to intellectual property, commercial arrangements, environmental, health and safety matters, joint venture agreements, labor and employment matters, domestic and foreign antitrust matters or other harms resulting from the actions of individuals or entities outside of our control. In the case of intellectual property litigation and proceedings, adverse outcomes could include the cancellation, invalidation or other loss of material intellectual property rights used in our business and injunctions prohibiting our use of our processes, apparatuses, technology, trade secrets and proprietary manufacturing expertise, methods and compounds that are

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subject to third-party patents or other third-party intellectual property rights. Litigation based on environmental matters or exposure to hazardous substances in the workplace or from our products could result in significant liability for us. For example, we are currently subject to various asbestos premises liability claims that relate to employee or contractor exposure to asbestos contained in certain building materials at our sites. Furthermore, our international operations expose us to potential administrative and regulatory proceedings in foreign jurisdictions. Antitrust authorities in Brazil have publicly announced that they are investigating alleged cartel activities by Brazilian silicate manufacturers, including our Brazilian subsidiary (“PQ Brazil”). The authorities allege that the activities occurred over an approximately 10-year period beginning in the late 1990s, which is prior to the time we owned PQ Brazil. PQ Brazil is fully cooperating with the authorities. Adverse outcomes in any of the foregoing could have a material adverse effect on our business. See “Business—Legal Proceedings.”

The terms of our indebtedness restrict our current and future operations, particularly our ability to respond to change or to take certain actions.

The indentures governing our outstanding indebtedness contain a number of restrictive covenants that impose significant operating and financial restrictions on us and may limit our ability to engage in acts that may be in our long-term best interest, including restrictions on our ability to incur additional indebtedness, make investments, acquisitions, loans and advances, sell, transfer or otherwise dispose of our assets or incur liens. See “Description of Certain Indebtedness” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Financial Condition, Liquidity and Capital Resources—Debt.” In addition, the restrictive covenants in the agreements governing our senior secured credit facilities require us to maintain specified financial ratios and satisfy other financial condition tests. Our ability to meet these financial ratios and tests can be affected by events beyond our control.

A breach of such covenants could result in an event of default unless we obtain a waiver to avoid such default. If we are unable to obtain a waiver, such a default may allow our creditors to accelerate the related debt and may result in the acceleration of, or default under, any other debt to which a cross-acceleration or cross-default provision applies. In the event our lenders or noteholders accelerate the repayment of our borrowings, we and our subsidiaries may not have sufficient assets to repay that indebtedness.

Because our operations are conducted through our subsidiaries and joint ventures, we are dependent on the receipt of distributions and dividends or other payments from our subsidiaries and joint ventures for cash to fund our operations and expenses, including to make future dividend payments, if any.

Our operations are conducted through our subsidiaries and joint ventures. As a result, our ability to make future dividend payments, if any, is dependent on the earnings of our subsidiaries and joint ventures and the payment of those earnings to us in the form of dividends, loans or advances and through repayment of loans or advances from us. Payments to us by our subsidiaries and joint ventures will be contingent upon our subsidiaries’ or joint ventures’ earnings and other business considerations and may be subject to statutory or contractual restrictions. We do not currently expect to declare or pay dividends on our common stock for the foreseeable future; however, to the extent that we determine in the future to pay dividends on our common stock, the agreements governing our outstanding indebtedness significantly restrict the ability of our subsidiaries to pay dividends or otherwise transfer assets to us.

We may need to recognize impairment charges related to goodwill, identified intangible assets and fixed assets.

We are required to test goodwill and any other intangible asset with an indefinite life for possible impairment on the same date each year and on an interim basis if there are indicators of a possible impairment. We are also required to evaluate indefinite-lived intangible assets and fixed assets for impairment if there are indicators of a possible impairment.

There is significant judgment required in the analysis of a potential impairment of goodwill, identified intangible assets and fixed assets. If, as a result of a general economic slowdown or deterioration in one or more

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of the industries in which we operate or in our financial performance or future outlook, or if the estimated fair value of our long-lived assets decreases, we may determine that one or more of our long-lived assets is impaired. An impairment charge would be determined based on the estimated fair value of the assets and any such impairment charge could have a material adverse effect on our results of operations and financial position.

Our ability to utilize our net operating losses is uncertain.

As of December 31, 2016, we had \$383.2 million of net operating losses for U.S. federal income tax purposes. Our ability to utilize these net operating losses to offset future income tax liabilities depends on our future financial performance and our future taxable income. In addition, our utilization of these net operating losses is currently limited under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), impacting our ability to realize the benefits of these net operating losses. If any ownership changes occur within three years of the closing date of the Business Combination among stockholders owning directly or indirectly 5% or more of our common stock and that result in an aggregate ownership change with respect to such stockholders of more than 50% of our common stock, our utilization of these net operating losses and certain built-in losses would be subject to an additional limitation imposed by Section 382 of the Code.

We have unfunded and underfunded pension plan liabilities. We will require current and future operating cash flow to fund these shortfalls. We have no assurance that we will generate sufficient cash flow to satisfy these obligations.

We maintain defined benefit pension plans covering employees who meet age and service requirements. While some of our plans have been frozen, our net pension liability and cost is materially affected by the discount rate used to measure pension obligations, the longevity and actuarial profile of our workforce, the level of plan assets available to fund those obligations and the actual and expected long-term rate of return on plan assets. Significant changes in investment performance or a change in the portfolio mix of invested assets can result in corresponding increases and decreases in the valuation of plan assets, particularly equity securities, or in a change in the expected rate of return on plan assets. Assets available to fund the pension and other postemployment benefit obligations of our plans as of December 31, 2016 were approximately \$285.1 million, or approximately \$86.2 million less than the measured pension benefit obligation on a GAAP basis. In addition, any changes in the discount rate could result in a significant increase or decrease in the valuation of pension obligations, affecting the reported funded status of our pension plans as well as the net periodic pension cost in the following years. Similarly, changes in the expected return on plan assets can result in significant changes in the net periodic pension cost in the following years.

We also contribute to two multi-employer pension plans on behalf of certain of our employees in the United States pursuant to union agreements that generally provide defined benefits to employees covered by collective bargaining agreements. A total of approximately 18 employees currently participate in such multi-employer pension plans. Funding requirements for benefit obligations of multi-employer pension plans are subject to certain regulatory requirements and we may be required to make cash contributions to one of these plans to satisfy certain underfunded benefit obligations. Absent an applicable exemption, a contributor to a U.S. multi-employer plan is liable upon its withdrawal from, or the termination of, a plan for its proportionate share of the plan's underfunding, if any.

We also provide certain health care and life insurance benefits to certain of our employees and their dependents in the United States upon the retirement of such employee from us pursuant to union agreements. Costs of these other post-employment benefit plans are dependent upon numerous factors, assumptions and estimates.

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Risks Related to this Offering and to our Common Stock

CCMP and INEOS will continue to have significant influence over us after this offering, which could limit your ability to influence the outcome of key transactions, including a change of control.

Following completion of this offering, investment funds affiliated with CCMP will beneficially own % of our outstanding common stock (% if the underwriters exercise their option to purchase additional shares in full) and INEOS will beneficially own % of our outstanding common stock (% if the underwriters exercise their option to purchase additional shares in full). For as long as affiliates of CCMP and INEOS continue to beneficially own a substantial percentage of the voting power of our outstanding common stock, they will continue to have significant influence over us. For example, they will be able to strongly influence or effectively control the election of all of the members of our board of directors and our business and affairs, including any determinations with respect to mergers or other business combinations, the acquisition or disposition of assets, the incurrence of additional indebtedness, the issuance of any additional shares of common stock or other equity securities, the repurchase or redemption of shares of our common stock and the payment of dividends.

Additionally, CCMP and INEOS are in the business of making investments in companies and may acquire and hold interests in businesses that compete directly or indirectly with us. CCMP and INEOS may also pursue acquisition opportunities that may be complementary to our business, and, as a result, those acquisition opportunities may not be available to us. See “—Our certificate of incorporation after this offering will contain a provision renouncing our interest and expectancy in certain corporate opportunities, which could adversely impact our business.”

Our stock price could be extremely volatile and, as a result, you may not be able to resell your shares at or above the price you paid for them.

Since our inception, there has not been a public market for our common stock, and an active public market for our common stock may not develop or be sustained following completion of this offering. In addition, the stock market in general has been highly volatile. As a result, the market price of our common stock is likely to be similarly volatile, and investors in our common stock may experience a decrease, which could be substantial, in the value of their stock, including decreases unrelated to our operating performance or prospects, and could lose part or all of their investment. The price of our common stock could be subject to wide fluctuations in response to a number of factors, including those described elsewhere in this prospectus and others such as:

- variations in our operating performance and the performance of our competitors;
- actual or anticipated fluctuations in our quarterly or annual operating results;
- publication of research reports by securities analysts about us, our competitors or our industry;
- our failure or the failure of our competitors to meet analysts’ projections or guidance that we or our competitors may give to the market;
- additions or departures of key personnel;
- strategic decisions by us or our competitors, such as acquisitions, divestitures, spin-offs, joint ventures, strategic investments or changes in business strategy;
- the passage of legislation or other regulatory developments affecting us or our industry;
- changes in legislation, regulation and government policy as a result of the U.S. presidential and congressional elections;
- speculation in the press or investment community;
- changes in accounting principles;

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- terrorist acts, acts of war or periods of widespread civil unrest;
- natural disasters and other calamities; and
- changes in general market and economic conditions.

In addition, broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance, and factors beyond our control may cause our stock price to decline rapidly and unexpectedly. We are exposed to the impact of any global or domestic economic disruption, including any potential impact of the vote by the United Kingdom to exit the European Union, commonly referred to as “Brexit.”

In the past, securities class action litigation has often been initiated against companies following periods of volatility in their stock price. This type of litigation could result in substantial costs and divert our management’s attention and resources, and could also require us to make substantial payments to satisfy judgments or to settle litigation.

If we fail to maintain effective internal control over financial reporting and effective disclosure controls and procedures, we may not be able to accurately report our financial results in a timely manner or prevent fraud, which may adversely affect investor confidence in our company.

We are not currently required to comply with the rules of the Securities and Exchange Commission (the “SEC”) implementing Section 404 of the Sarbanes-Oxley Act and therefore are not required to make a formal assessment of the effectiveness of our internal control over financial reporting for that purpose. Upon becoming a public company, we will be required to comply with the SEC’s rules implementing Sections 302 and 404 of the Sarbanes-Oxley Act, which will require management to certify financial and other information in our quarterly and annual reports and provide an annual management report on the effectiveness of internal control over financial reporting. Although we will be required to disclose changes that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting on a quarterly basis, we will not be required to make our first annual assessment of our internal control over financial reporting pursuant to Section 404 until our second annual report required to be filed with the SEC.

To comply with the requirements of being a public company, we may need to undertake various actions, to develop, implement and test additional processes and other controls. Testing and maintaining internal controls can divert our management’s attention from other matters related to the operation of our business. In addition, when evaluating our internal control over financial reporting, we may identify material weaknesses that we may not be able to remediate resulting in our management being unable to assert that our internal control over financial reporting is effective.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim consolidated financial statements will not be prevented or detected on a timely basis.

As a private company, we identified a material weakness related to our control environment that was the result of the fact that Eco had insufficient resources and financial expertise to effectively carry out the accounting functions for its business. This identified material weakness contributed to control deficiencies in legacy Eco’s internal control over financial reporting that originated prior to the Business Combination. These deficiencies related to: (i) the inadequate design of controls to review the transactions within Eco’s account for goods received, but not invoiced, for appropriateness at period end which resulted in misstatements to cost of goods sold and property, plant and equipment and (ii) the inadequate design of appropriate controls to account for fair value adjustments to property, plant, and equipment, which resulted in misstatements to depreciation expense following the Business Combination. These control deficiencies were considered to be material weaknesses because they could have resulted in a misstatement of the aforementioned account balances or disclosures that would result in a material misstatement to the annual or interim consolidated financial statements that would not be prevented or detected.

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We have implemented improved processes and internal controls through integration with PQ Group Holdings processes and upgrading the organizational design and personnel performing the processes and controls specific to the Eco business unit. These control deficiencies were unremediated as of December 31, 2016 as the controls that we designed after the Business Combination to address these control deficiencies had not been operating for a sufficient amount of time to conclude that they had been remediated. We have completed further testing of these corrective actions and believe that the remediation activities were sufficient to remediate the previously existing material weaknesses as of March 31, 2017.

We cannot provide assurance that additional material weaknesses or control deficiencies will not occur in the future. If we identify additional material weaknesses in our internal control over financial reporting or are unable to comply with the requirements of Section 404 in a timely manner or assert that our internal control over financial reporting is effective, or if our independent registered public accounting firm is unable to express an unqualified opinion as to the effectiveness of our internal control over financial reporting in future periods, investors may lose confidence in the accuracy and completeness of our financial reports and the market price of our common stock could be negatively affected.

Your percentage ownership in us may be diluted by future issuances of capital stock, which could reduce your influence over matters on which stockholders vote.

Following completion of this offering, our board of directors has the authority, without action or vote of our stockholders, to issue all or any part of our authorized but unissued shares of common stock, including shares issuable upon exercise of options, or shares of our authorized but unissued preferred stock. Issuances of common stock or voting preferred stock would reduce your influence over matters on which our stockholders vote and, in the case of issuances of preferred stock, would likely result in your interest in us being subject to the prior rights of holders of that preferred stock.

There may be sales of a substantial amount of our common stock after this offering by our current stockholders, and these sales could cause the price of our common stock to fall.

Following completion of this offering, there will be _____ shares of our common stock outstanding. Of our issued and outstanding shares, all of the common stock sold in this offering will be freely transferable, except for any shares held by our “affiliates,” as that term is defined in Rule 144 under the Securities Act of 1933, as amended (the “Securities Act”). Following completion of this offering, approximately % and % of our outstanding common stock (or approximately % and % if the underwriters exercise their option to purchase additional shares in full) will be held by affiliates of CCMP and by INEOS, respectively.

Each of our officers and directors and certain holders of our common stock have entered into a lock-up agreement with Morgan Stanley & Co. LLC and Goldman Sachs & Co. LLC, as representatives of the underwriters, which regulates their sales of our common stock for a period of 180 days after the date of this prospectus, subject to certain exceptions. Morgan Stanley & Co. LLC and Goldman Sachs & Co. LLC may, in their sole discretion, release all or some portion of the shares subject to lock-up agreements at any time and for any reason. See “Shares Eligible for Future Sale—Lock-Up Agreements.”

Sales of substantial amounts of our common stock in the public market after this offering, the perception that such sales will occur, or early release of these lock-up agreements could adversely affect the market price of our common stock and make it difficult for us to raise funds through securities offerings in the future. Of the shares of our common stock to be outstanding following completion of this offering, the shares offered by this prospectus will be eligible for immediate sale in the public market without restriction by persons other than our affiliates. Our remaining outstanding shares will become available for resale in the public market as shown in the chart below, subject to the provisions of Rule 144 and Rule 701.

Number of Shares

Date Available for Resale

180 days after this offering (_____, 2018)
subject to certain exceptions

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Beginning 180 days after this offering, subject to certain exceptions, investment funds affiliated with CCMP may require us to register shares of our common stock held by them for resale under the federal securities laws, subject to reduction upon the request of the underwriter of the offering, if any. See “Certain Relationships and Related Party Transactions—Amended and Restated Stockholders Agreement.” Registration of those shares would allow the investment funds affiliated with CCMP to immediately resell their shares in the public market. Any such sales or anticipation thereof could cause the market price of our common stock to decline.

In addition, following completion of this offering, we intend to register shares of our common stock that we expect to issue pursuant to the 2017 Plan. For more information, see “Shares Eligible for Future Sale—Registration Statements on Form S-8.”

Provisions in our charter documents after this offering and Delaware law may deter takeover efforts that you feel would be beneficial to stockholder value.

In addition to investment funds affiliated with CCMP’s and INEOS’s beneficial ownership of a substantial percentage of our common stock, provisions in our certificate of incorporation and bylaws after this offering and Delaware law could make it harder for a third party to acquire us, even if doing so might be beneficial to our stockholders. These provisions include a classified board of directors and the ability of our board of directors to issue preferred stock without stockholder approval that could be used to dilute a potential hostile acquirer. Our certificate of incorporation will also impose some restrictions on mergers and other business combinations between us and any holder of 15% or more of our outstanding common stock other than INEOS and investment funds affiliated with CCMP. As a result, you may lose your ability to sell your stock for a price in excess of the prevailing market price due to these protective measures, and efforts by stockholders to change the direction or management of the company may be unsuccessful. See “Description of Capital Stock—Anti-Takeover Effects of our Certificate of Incorporation and Bylaws.”

Our certificate of incorporation after this offering will designate courts in the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders’ ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our certificate of incorporation will provide that, subject to limited exceptions, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for:

- any derivative action or proceeding brought on our behalf;
- any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders;
- any action asserting a claim against us arising pursuant to any provision of the General Corporation Law of the State of Delaware, our certificate of incorporation or our bylaws;
- any action to interpret, apply, enforce or determine the validity of our certificate of incorporation or bylaws; or
- any other action asserting a claim against us that is governed by the internal affairs doctrine (each, a “Covered Proceeding”).

In addition, our certificate of incorporation will provide that if any action the subject matter of which is a Covered Proceeding is filed in a court other than the specified Delaware courts without the approval of our board of directors (each, a “Foreign Action”), the claiming party will be deemed to have consented to (i) the personal jurisdiction of the specified Delaware courts in connection with any action brought in any such courts to enforce the exclusive forum provision described above 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.

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Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to these provisions. These provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and employees. Alternatively, if a court were to find these provisions of our certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business and financial condition.

If you purchase shares in this offering, you will suffer immediate and substantial dilution.

If you purchase shares of our common stock in this offering, you will incur immediate and substantial dilution in the pro forma book value of your stock of \$ per share as of June 30, 2017 based on an assumed initial public offering price of \$ per share, which is the midpoint of the price range set forth on the cover of this prospectus, because the price that you pay will be substantially greater than the net tangible book value per share of the shares you acquire. You will experience additional dilution upon the exercise of options to purchase shares of our common stock, including those options currently outstanding and those granted in the future, and the issuance of restricted stock or other equity awards under our stock incentive plans. To the extent we raise additional capital by issuing equity securities, our stockholders will experience substantial additional dilution. See "Dilution."

Our certificate of incorporation after this offering will contain a provision renouncing our interest and expectancy in certain corporate opportunities, which could adversely impact our business.

Each of CCMP and INEOS, and the members of our board of directors who are affiliated with CCMP and INEOS, by the terms of our certificate of incorporation, will not be required to offer us any corporate opportunity of which they become aware and can take any such corporate opportunity for themselves or offer it to other companies in which they have an investment. We, by the terms of our certificate of incorporation, will expressly renounce any interest or expectancy in any such corporate opportunity to the extent permitted under applicable law, even if the opportunity is one that we or our subsidiaries might reasonably have pursued or had the ability or desire to pursue if granted the opportunity to do so. Our certificate of incorporation will not be able to be amended to eliminate our renunciation of any such corporate opportunity arising prior to the date of any such amendment.

CCMP and INEOS are in the business of making investments in companies and may from time to time acquire and hold interests in businesses that compete directly or indirectly with us. These potential conflicts of interest could have a material adverse effect on our business, financial condition, results of operations or prospects if CCMP or INEOS allocate attractive corporate opportunities to themselves or their affiliates instead of to us.

There is no existing market for our common stock and we do not know if one will develop to provide you with adequate liquidity to sell our common stock at prices equal to or greater than the price you paid in this offering.

Prior to this offering, there has not been a public market for our common stock. We cannot predict the extent to which an active trading market on the New York Stock Exchange will develop. If an active trading market does not develop, you may have difficulty selling any of our common stock that you buy. The initial public offering price for our common stock will be determined by negotiations between us and the representative of the underwriters and may not be indicative of prices that will prevail in the open market following this offering. Consequently, you may not be able to sell our common stock at prices equal to or greater than the price you paid in this offering, or at all.

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As a public company, we will become subject to additional laws, regulations and stock exchange listing standards, which will impose additional costs on us and may strain our resources and divert our management's attention.

Prior to this offering, we operated on a private basis. After this offering, we will be subject to the reporting requirements of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, the listing requirements of the New York Stock Exchange and other applicable securities laws and regulations. Compliance with these laws and regulations will increase our legal and financial compliance costs and make some activities more difficult, time-consuming or costly, which may strain our resources or divert management's attention.

Regulations related to conflict minerals could adversely impact our business.

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 contains provisions to improve transparency and accountability concerning the supply of certain minerals, known as conflict minerals, originating from the Democratic Republic of Congo (the "DRC") and adjoining countries. The SEC requires annual disclosure and reporting requirements for those companies who use conflict minerals mined from the DRC and adjoining countries in their products. These reporting requirements, first applicable to us in 2019, will require us to conduct due diligence to comply with such requirements. There will be costs associated with complying with these disclosure requirements, including for diligence to determine the sources of conflict minerals used in our products and other potential changes to products, processes or sources of supply as a consequence of such verification activities. These rules could adversely affect the sourcing, supply and pricing of materials used in our products. As there may be only a limited number of suppliers offering "conflict free" conflict minerals, we cannot be sure that we will be able to obtain necessary conflict minerals from such suppliers in sufficient quantities or at competitive prices.

Our management has broad discretion in the use of the net proceeds from this offering and may not use the net proceeds effectively.

We intend to use the net proceeds from this offering primarily to repay a portion of our indebtedness. Our management will have broad discretion in the application of the remaining net proceeds of this offering, if any. We cannot specify with certainty the additional uses to which we will apply any remaining net proceeds that we receive from this offering. Accordingly, you will be relying on the judgment of our management with regard to the use of such net proceeds, and you will not have the opportunity as part of your investment decision to assess whether the proceeds are being used appropriately. You may not agree with how the proceeds are used. It is possible that the proceeds will be invested in a way that does not yield a favorable, or any, return for the company. The failure by our management to apply these funds effectively could adversely affect our ability to continue to maintain and expand our business.

Because we have no current plans to pay cash dividends on our common stock for the foreseeable future, you may not receive any return on investment unless you sell your common stock for a price greater than that which you paid for it.

We may retain future earnings, if any, for future operations, expansion and debt repayment and have no current plans to pay any cash dividends for the foreseeable future. Any decision to declare and pay dividends in the future will be made at the discretion of our board of directors and will depend on, among other things, our results of operations, financial condition, cash requirements, contractual restrictions and other factors that our board of directors may deem relevant. In addition, our ability to pay dividends may be limited by covenants of any existing and future outstanding indebtedness we or our subsidiaries incur, including our credit facilities and outstanding notes. See "—Because our operations are conducted through our subsidiaries and joint ventures, we are dependent on the receipt of distributions and dividends or other payments from our subsidiaries and joint ventures for cash to fund our operations and expenses, including to make future dividend payments, if any." As a result, you may not receive any return on an investment in our common stock unless you sell your common stock for a price greater than that which you paid for it.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, including the sections entitled “Prospectus Summary,” “Risk Factors,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” “Business” and “Industry,” contains forward-looking statements. All statements other than statements of historical facts contained in this prospectus, including statements regarding our future results of operations and financial position, business strategy and plans and our objectives for future operations, are forward-looking statements. 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 objectives, 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, including those described in “Risk Factors.” 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 in this prospectus 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;

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- the extensive environmental, health and safety regulations to which we are subject;
- disruption of production and distribution of our products;
- our insurance coverage;
- 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;
- our substantial indebtedness; and
- other factors that are described in “Risk Factors.”

The forward-looking statements included in this prospectus 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 prospectus to conform these statements to actual results or to changes in our expectations.

You should read this prospectus with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect.

THE RECLASSIFICATION

In connection with this offering, on _____, 2017, we reclassified our Class A common stock into common stock and then effected a _____-for-1 split of our common stock. Following the reclassification of our Class A common stock, we had two classes of common stock outstanding, common stock and Class B common stock. The Class B common stock was identical to the Class A common stock, except that the Class B common stock was convertible into shares of our common stock as described below, and each share of Class B common stock was entitled to a preferential payment upon any liquidating distribution by us to holders of our capital stock, whether by dividend, distribution or otherwise, equal to the unreturned paid-in-capital amount for such share (\$ _____). After payment of this preference amount, each share of common stock and Class B common stock shared equally in all distributions by us to holders of our common stock.

Immediately prior to this offering, we will convert each outstanding share of our Class B common stock into approximately _____ shares of our common stock plus an additional number of shares of our common stock determined by dividing the unreturned paid-in capital amount of such share of Class B common stock, or \$ _____ per share, by the initial public offering price of a share of our common stock in this offering, rounded to the nearest whole share. Holders of our Class B common stock will not receive any cash payments from us in connection with the conversion of the Class B common stock.

References to the “Reclassification” throughout this prospectus refer to the reclassification of our Class A common stock into our common stock, the _____-for-1 split of our common stock and the conversion of our Class B common stock into our common stock.

Assuming an initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus, _____ shares of common stock will be outstanding immediately after the Reclassification but before this offering. The actual number of shares of our common stock that will be issued as a result of the Reclassification is subject to change based on the actual initial public offering price. See “Description of Capital Stock.”

Because the number of shares of common stock into which a share of our Class B common stock is convertible will be determined by reference to the initial public offering price in this offering, a change in the initial public offering price would have a corresponding impact on the number of outstanding shares of our common stock presented in this prospectus after giving effect to this offering. The following number of shares of our common stock would be outstanding immediately after the Reclassification but before this offering, assuming the initial public offering prices for our common stock shown below.

	\$	\$	\$	\$	\$
Class B conversion factor					
Shares outstanding ⁽¹⁾					

(1) For additional information regarding the impact of a change in the initial public offering price on the number of shares outstanding after giving effect to this offering, see Note 6 to our unaudited pro forma balance sheet as of June 30, 2017 included under “Unaudited Pro Forma Financial Information of PQ Group Holdings.”

USE OF PROCEEDS

We estimate that the net proceeds we will receive from the sale of the shares of our common stock in this offering, after deducting underwriting discounts and commissions and estimated expenses payable by us, will be approximately \$ million (or \$ million if the underwriters exercise their option to purchase additional shares in full). This estimate assumes an initial public offering price of \$ per share, which is the midpoint of the price range set forth on the cover of this prospectus.

We intend to use the net proceeds from this offering to redeem approximately \$ million in aggregate principal amount of PQ Corporation's Floating Rate Senior Unsecured Notes due 2022 (the "Floating Rate Senior Unsecured Notes"), including accrued and unpaid interest and applicable redemption premiums, and the remaining net proceeds, if any, for general corporate purposes. As of June 30, 2017, there was \$525.0 million aggregate principal amount of Floating Rate Senior Unsecured Notes outstanding and approximately \$0.4 million of accrued and unpaid interest. The Floating Rate Senior Unsecured Notes bear interest at an annual rate equal to the three-month LIBOR plus 10.75%, with a 1% LIBOR floor, and mature on May 1, 2022, provided that if PQ Corporation's 8.5% Senior Notes due 2022 have been refinanced or otherwise repaid prior to such date, the Floating Rate Senior Unsecured Notes will instead mature on May 1, 2023. Up to 50% of the Floating Rate Senior Unsecured Notes may be redeemed at a price equal to 106% of the principal amount thereof plus accrued and unpaid interest using the net proceeds from this offering and we have agreed with certain of our noteholders holding approximately % of the Floating Rate Senior Unsecured Notes to redeem the remaining 50% held by such noteholders at a price equal to % of the principal amount thereof, plus accrued and unpaid interest. We estimate that this reduction of approximately \$ million in aggregate principal amount of Floating Rate Senior Unsecured Notes will decrease our annual interest expense by \$ million and our annual weighted average cost of debt to %. For additional information regarding the Floating Rate Senior Unsecured Notes, see "Description of Certain Indebtedness."

A \$1.00 increase (decrease) in the assumed initial public offering price of \$ per share, which is the midpoint of the price range set forth on the cover of this prospectus, would increase (decrease) the net proceeds to us from this offering by approximately \$ million (or approximately \$ million if the underwriters exercise their option to purchase additional shares in full), assuming the number of shares offered by us, as set forth on the cover of this prospectus, remains the same and after deducting underwriting discounts and commissions and estimated expenses payable by us. An increase (decrease) of 1.0 million in the number of shares offered by us in this offering would increase (decrease) the net proceeds to us from this offering by approximately \$ million (or approximately \$ million if the underwriters exercise their option to purchase additional shares in full), assuming the initial public offering price of \$ per share, which is the midpoint of the price range set forth on the cover of this prospectus, remains the same and after deducting underwriting discounts and commissions and estimated expenses payable by us. In the event the net proceeds to us from this offering are lower than the assumed amount, the amount of Floating Rate Senior Unsecured Notes that we intend to redeem would change by a corresponding amount. The information above is illustrative only and will change based on the actual initial public offering price and other terms of this offering determined at pricing.

DIVIDEND POLICY

Our board of directors does not currently intend to pay regular dividends on our common stock. However, we expect to reevaluate our dividend policy on a regular basis following this offering and may, subject to compliance with the covenants contained in the agreements governing our credit facilities, the indentures governing our outstanding notes, applicable law and other considerations, determine to pay dividends in the future. See “Description of Certain Indebtedness.”

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CAPITALIZATION

The following table sets forth our cash and cash equivalents and our capitalization as of June 30, 2017 on (1) an actual basis and (2) an as adjusted basis to give effect to (i) the Reclassification that will be completed immediately prior to this offering, as described under “The Reclassification,” as if it had occurred on June 30, 2017 and based on an assumed initial public offering price of \$ per share, which is the midpoint of the price range set forth on the cover of this prospectus, and (ii) the sale by us of shares of our common stock in this offering, assuming no exercise of the underwriters’ option to purchase additional shares, at an assumed initial public offering price of \$ per share, which is the midpoint of the price range set forth on the cover of this prospectus, and the application of the net proceeds therefrom, as described under “Use of Proceeds,” after deducting estimated underwriting discounts and commissions and estimated expenses payable by us.

The following table should be read in conjunction with “The Reclassification,” “Use of Proceeds,” “Unaudited Pro Forma Financial Information of PQ Group Holdings,” “Selected Consolidated Financial Data of PQ Group Holdings,” “Supplemental Selected Consolidated Financial Data of Legacy PQ,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and the related notes included elsewhere in this prospectus.

	As of June 30, 2017	
	Actual	As Adjusted(1)
	(in thousands)	
Cash and cash equivalents	\$ 50,457	\$
Debt:		
Senior secured U.S. dollar denominated term loan facility	\$ 920,792	\$
Senior secured Euro denominated term loan facility	321,752	
6.75% Senior Secured Notes due 2022	625,000	
Floating Rate Senior Unsecured Notes due 2022	525,000	
8.5% Senior Notes due 2022	200,000	
ABL revolving credit facility	65,000	
Other	70,944	
Total debt	2,728,488	
Stockholder’s Equity:		
Class A common stock, \$0.01 par value per share, 160,500,000 shares authorized, 627,251 shares issued and 625,172 shares outstanding on an actual basis; no shares authorized, issued or outstanding on an as adjusted basis	6	
Class B common stock, \$0.01 par value per share, 30,000,000 shares authorized, 6,727,685 shares issued and 6,711,756 shares outstanding on an actual basis; no shares authorized, issued or outstanding on an as adjusted basis	67	
Common stock, \$0.01 par value per share; no shares authorized, issued or outstanding on an actual basis; shares authorized and shares issued and outstanding on an as adjusted basis	—	
Preferred stock, \$0.01 par value per share, 1,500,000 shares authorized and no shares issued and outstanding on an actual basis; shares authorized and no shares issued or outstanding on an as adjusted basis	—	
Additional paid-in capital	1,169,965	
Accumulated deficit	(94,443)	
Treasury stock, at cost	(239)	
Accumulated other comprehensive loss	(15,798)	
Total stockholders’ equity	1,059,558	
Noncontrolling interest	4,858	
Total capitalization	\$3,792,904	\$

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- (1) A \$1.00 increase (decrease) in the assumed initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus, would increase (decrease) the net proceeds to us from this offering by approximately \$ _____ million (or approximately \$ _____ million if the underwriters exercise their option to purchase additional shares in full), assuming the number of shares offered by us, as set forth on the cover of this prospectus, remains the same and after deducting underwriting discounts and commissions and estimated expenses payable by us. An increase (decrease) of 1.0 million in the number of shares offered by us in this offering would increase (decrease) the net proceeds to us from this offering by approximately \$ _____ million (or approximately \$ _____ million if the underwriters exercise their option to purchase additional shares in full), assuming the initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus, remains the same and after deducting underwriting discounts and commissions and estimated expenses payable by us. In the event the net proceeds to us from this offering are lower than the assumed amount, the amount of Floating Rate Senior Unsecured Notes that we intend to redeem would change by a corresponding amount. See “Use of Proceeds.”

DILUTION

If you invest in our common stock, your ownership interest will be immediately diluted to the extent of the difference between the initial public offering price per share of our common stock and the net tangible book value per share of our common stock after this offering. Dilution results from the fact that the initial public offering price per share of the common stock is substantially in excess of the book value per share of our common stock attributable to the existing stockholders for the presently outstanding shares of common stock. We calculate net tangible book value per share of our common stock by dividing the net tangible book value (total consolidated tangible assets less total consolidated liabilities) by the number of outstanding shares of our common stock.

Our net tangible book value at June 30, 2017 was approximately \$(1,039.1) million, or \$ _____ per share of our common stock after giving effect to the Reclassification but before giving effect to this offering. Pro forma net tangible book value per share before this offering has been determined by dividing net tangible book value by the number of shares of common stock outstanding at June 30, 2017, assuming the Reclassification had taken place on June 30, 2017. Dilution in net tangible book value per share represents the difference between the amount per share that you pay in this offering and the net tangible book value per share immediately after this offering.

After giving effect to the receipt of the estimated net proceeds from our sale of shares in this offering, assuming an initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus, and the application of the estimated net proceeds therefrom as described under "Use of Proceeds," our pro forma net tangible book value at June 30, 2017 would have been approximately \$ _____ million, or \$ _____ per share of our common stock. This represents an immediate increase in net tangible book value per share of \$ _____ to existing stockholders and an immediate decrease in net tangible book value per share of \$ _____ to you. The following table illustrates this dilution per share.

	\$
Assumed initial public offering price per share	
Pro forma net tangible book value per share at June 30, 2017	\$
Increase per share attributable to new investors in this offering	_____
Pro forma net tangible book value per share after this offering	_____
Dilution per share to new investors	\$ _____

If the underwriters exercise their option to purchase additional shares in full, the pro forma net tangible book value per share after giving effect to this offering would be \$ _____ per share of our common stock. This represents an increase in pro forma net tangible book value of \$ _____ per share to existing stockholders and dilution in pro forma net tangible book value of \$ _____ per share of our common stock to you.

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A \$1.00 increase (decrease) in the assumed initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus, would increase (decrease) our pro forma net tangible book value after giving effect to this offering by \$ _____ million, or by \$ _____ per share, assuming no change to the number of shares of our common stock offered by us as set forth on the cover page of this prospectus, and after deducting the estimated underwriting discounts and commissions and estimated expenses payable by us. Because the number of shares of our common stock into which a share of our Class B common stock is convertible will be determined by reference to the initial public offering price in this offering, a change in the initial public offering price would also have a corresponding impact on our pro forma net tangible book value per share of our common stock. Our pro forma net tangible book value per share of our common stock would have been the following at June 30, 2017, assuming the initial public offering prices for our common stock shown below:

\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
\$ _____	\$ _____	\$ _____	\$ _____	\$ _____

The following table sets forth, as of June 30, 2017, the number of shares of our common stock purchased from us, the total consideration paid to us and the average price per share paid by existing stockholders and to be paid by new investors purchasing shares in this offering, before deducting underwriting discounts and commissions and estimated offering expenses payable by us.

	Shares Purchased		Total Consideration		Average Price
	Number	Percent	Amount	Percent	Per Share
Existing stockholders ⁽¹⁾		%	\$ _____	%	\$ _____
New investors					
Total		100%		100%	\$ _____

(1) The number of shares purchased by existing stockholders is determined as follows:

Class B shares issued and outstanding as of June 30, 2017	
Less: Class B treasury shares as of June 30, 2017	_____
Net Class B shares outstanding as of June 30, 2017	
Class B conversion factor ^(a)	_____
Converted net Class B shares as of June 30, 2017	
Common shares issued and outstanding as of June 30, 2017	
Less: Common treasury shares as of June 30, 2017	_____
Total common shares purchased by existing stockholders	

(a) See “The Reclassification” for a computation of the Class B conversion factor.

Because the number of shares of our common stock into which a share of our Class B common stock is convertible will be determined by reference to the initial public offering price in this offering, a change in the initial public offering price would have a corresponding impact on the number of shares purchased by existing stockholders. The number of shares purchased by existing stockholders would have been the following as of June 30, 2017, assuming the initial public offering prices for our common stock shown below:

Class B conversion factor	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
Shares purchased by existing stockholders					
Percent of total shares purchased by existing stockholders					

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If the underwriters were to exercise their option to purchase additional shares in full, the percentage of shares of our common stock held by existing stockholders would be %, and the percentage of shares of our common stock held by new investors would be %.

To the extent any outstanding options or other equity awards are exercised or become vested or any additional options or other equity awards are granted and exercised or become vested or other issuances of our common stock are made, there may be further economic dilution to new investors.

**UNAUDITED PRO FORMA FINANCIAL INFORMATION
OF PQ GROUP HOLDINGS**

The unaudited pro forma statement of operations for the year ended December 31, 2016 presented below was derived from our audited consolidated financial statements included elsewhere in this prospectus. The unaudited pro forma balance sheet as of June 30, 2017 and the unaudited pro forma statement of operations for the six months ended June 30, 2017 presented below were derived from our unaudited consolidated financial statements included elsewhere in this prospectus.

On May 4, 2016, we consummated the Business Combination to reorganize and combine the businesses of legacy PQ and legacy Eco under a new holding company, PQ Group Holdings. Investment funds affiliated with CCMP held a controlling interest in legacy Eco prior to the Business Combination. Legacy Eco is treated as the acquirer in the Business Combination and the predecessor to PQ Group Holdings for accounting purposes.

The unaudited pro forma statement of operations for the year ended December 31, 2016 includes our historical results of operations and the results of operations of legacy PQ, after giving pro forma effect to the Business Combination and the related financing transactions as if they had occurred on January 1, 2015.

The unaudited pro forma statements of operations for the year ended December 31, 2016 and the six months ended June 30, 2017 and the unaudited pro forma balance sheet as of June 30, 2017 give effect to the following as if they had occurred on January 1, 2016 and June 30, 2017, respectively:

- the retroactive application of the reclassification of our Class A common stock into our common stock, the -for-1 split of our common stock and the conversion of our Class B common stock into our common stock as described in “The Reclassification”;
- the issuance of shares of our common stock in this offering; and
- the use of the net proceeds from this offering to repay \$ million of outstanding indebtedness as described in “Use of Proceeds.”

The unaudited pro forma financial information has been prepared from, and should be read in conjunction with, the respective historical consolidated financial statements and related notes of PQ Group Holdings and legacy PQ appearing elsewhere in this prospectus. See also “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

We describe the assumptions underlying the pro forma adjustments in the accompanying notes, which should be read in conjunction with this unaudited pro forma financial information. The unaudited pro forma adjustments are based upon available information and assumptions that we believe are factually supportable, directly attributable to the Business Combination and the related financing transactions, the Reclassification and this offering 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. The unaudited pro forma statements of operations are not intended to represent what our results of operations would have been if the Business Combination, the related financing transactions and this offering had occurred on the dates indicated above or to project our results of operations for any future period. The unaudited pro forma statements of operations may not be comparable to, or indicative of, future performance.

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UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the year ended December 31, 2016
(Dollars in thousands, except per share data)

	<u>PQ Group Holdings Inc.</u>	<u>PQ Holdings Inc.</u>	<u>Adjustments</u>	<u>Pro Forma</u>	<u>Adjustments</u>	<u>Pro Forma for</u>
	<u>Year ended</u>	<u>Period from</u>	<u>Related to the</u>	<u>for the</u>	<u>Related to the</u>	<u>the Business</u>
	<u>December 31, 2016</u>	<u>January 1, 2016</u>	<u>Business</u>	<u>Business</u>	<u>Offering and</u>	<u>Combination,</u>
		<u>through</u>	<u>Combination</u>	<u>Combination</u>	<u>Reclassification</u>	<u>Offering and</u>
		<u>May 3, 2016</u>	<u></u>	<u></u>	<u></u>	<u>Reclassification</u>
Sales	\$ 1,064,177	\$ 339,420	\$ (556) ⁽¹⁾	\$1,403,041	\$ —	\$ 1,403,041
Cost of goods sold	810,085	248,842	(21,818) ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾	1,037,109	—	1,037,109
Gross profit	254,092	90,578	21,262	365,932	—	365,932
Selling, general and administrative expenses	107,601	39,404	(1,964) ⁽⁵⁾	145,041	—	145,041
Other operating expense, net	62,301	13,565	(894) ⁽⁶⁾⁽⁷⁾	74,972	—	74,972
Operating income	84,190	37,609	24,120	145,919	—	145,919
Equity in net loss (income) from affiliated companies	2,612	(8,078)	(29,744) ⁽⁸⁾	(35,210)	—	(35,210)
Interest expense	140,315	37,310	10,320 ⁽⁹⁾	187,945	(14)	—
Debt extinguishment costs	13,782	40,153	(52,142) ⁽¹⁰⁾⁽¹¹⁾⁽¹²⁾	1,793	—	1,793
Other expense (income), net	(3,402)	(5,467)	—	(8,869)	—	(8,869)
Income (loss) before income taxes and noncontrolling interest	(69,117)	(26,309)	95,686	260	—	—
Provision for income taxes	10,041	11,391	36,535 ⁽¹³⁾	57,967	(15)	57,967
Net (loss) income	(79,158)	(37,700)	59,151	(57,707)	—	(57,707)
Less: Net income attributable to the noncontrolling interest	588	637	—	1,225	—	1,225
Net (loss) income attributable to the Combined Business	\$ (79,746)	\$ (38,337)	\$ 59,151	\$ (58,932)	\$ —	\$ —
Class B shares⁽¹⁶⁾						
Net (loss) per share, basic and diluted	—	—	—	—	—	—
Weighted average shares outstanding, basic and diluted	—	—	—	4,947,982	—	—
Class A shares⁽¹⁶⁾						
Net (loss) per share, basic and diluted	—	—	—	\$ (137.03)	—	—
Weighted average shares outstanding, basic and diluted	—	—	—	430,051	—	—
Common stock⁽¹⁷⁾						
Net (loss) per share, basic and diluted	—	—	—	—	\$ —	\$ —
Weighted average shares outstanding, basic and diluted	—	—	—	—	—	—

NOTES TO THE UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the year ended December 31, 2016
(Dollars in thousands)

- (1) Represents the elimination of \$556 in intercompany sales and related cost of goods sold between PQ Holdings and the company during the period from January 1, 2016 through May 3, 2016.
- (2) Represents the depreciation expense associated with the step-up of fixed assets of \$19,903, less the adjustment of previously recognized depreciation recorded by legacy PQ of \$18,902, for the pre-Business Combination period from January 1, 2016 through May 3, 2016. Depreciation expense related to property, plant and equipment is calculated on a straight-line basis over the estimated useful lives of the assets, ranging from three to thirty-three years. Depreciation expense related to leasehold improvements is calculated on a straight-line basis over the shorter of the useful life of the improvement or remaining lease term.
- (3) Represents the amortization expense associated with the step-up of certain intangible assets of \$4,949 for the pre-Business Combination period from January 1, 2016 through May 3, 2016, less the adjustment of previously recognized amortization recorded by PQ Holdings of \$1,528. Amortization expense is calculated on a straight-line basis over the estimated useful lives of the intangible assets, ranging from five to twenty years.
- (4) Represents the adjustment of previously recognized, non-recurring amortization expense associated with the step-up in fair value of inventory of \$25,684 for the year ended December 31, 2016.

Below is a summary of adjustments (1), (2), (3), and (4) outlined above to cost of goods sold to arrive at the net adjustment recorded in the pro forma statement of operations:

Category	Adjustment
Adjustments that increase cost of goods sold	
(2) Depreciation expense related to the step-up in fair value of property, plant and equipment	\$ 19,903
(3) Amortization expense related to the step-up in fair value of definite-lived intangible assets	4,949
	<u>24,852</u>
Adjustments that decrease cost of goods sold	
(1) Removal of cost of goods sold related to intercompany sales	(556)
(2) Removal of previously recognized depreciation expense recorded by PQ Holdings	(18,902)
(3) Removal of previously recognized amortization expense recorded by PQ Holdings	(1,528)
(4) Removal of the one-time charge related to the step-up in fair value of inventory	(25,684)
	<u>(46,670)</u>
Reduction in cost of goods sold	<u>\$ (21,818)</u>

Below is a summary of the assumptions used to calculate the depreciation expense related to the step-up in fair value of property, plant and equipment and the amortization expense related to the step-up in fair value of definite-lived intangible assets:

Asset Class	Fair Value	Estimated Useful Life	Depreciation Adjustment to Cost of Goods Sold
Land	\$ 101,337	Indefinite	\$ —
Buildings	112,041	15 to 33 years	3,202
Machinery and equipment	338,766	3 to 10 years	16,701
Construction in progress	131,529		—
	<u>\$ 683,673</u>		<u>\$ 19,903</u>

NOTES TO THE UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the year ended December 31, 2016
(Dollars in thousands)

	Amount	Weighted-Average Expected Useful Life (in years)	Amortization Adjustment to Cost of Goods Sold
Intangible assets subject to amortization:			
Trademarks	\$ 35,400	15	\$ —
Technical know-how	189,300	20	3,120
Contracts	19,800	5.3	1,829
Customer relationships	268,700	10.6	—
In-process research and development	6,800		—
Total intangible assets subject to amortization	520,000		4,949
Tradenames, not subject to amortization	151,100	Indefinite	—
Trademarks, not subject to amortization	82,900	Indefinite	—
Total	\$754,000		\$ 4,949

- (5) Represents additional depreciation expense associated with the step-up of fixed assets of \$1,161, less the adjustment of previously recognized depreciation expense recorded by legacy PQ of \$980, for the pre-Business Combination period from January 1, 2016 through May 3, 2016. Adjustment also reflects changes related to the modification of stock compensation awards as a result of the Business Combination. Stock compensation expense has been adjusted to remove previously recorded stock compensation expense of \$2,356 for legacy Eco and legacy PQ in the period from January 1, 2016 through May 3, 2016, as well as \$1,174 related to an acceleration of expense due to a partial cash settlement related to the legacy Eco awards. The additional \$1,385 for stock compensation expense based on the new capital structure represents the fair value of the newly granted awards that would have been recognized for the period from January 1, 2016 through May 3, 2016 assuming the Business Combination occurred on January 1, 2015. No further adjustment has been made, as the expense related to these awards is already reflected in the post-Business Combination period from May 4, 2016 through December 31, 2016.

Category	Adjustment
Adjustments that increase selling, general and administrative expenses	
Depreciation expense related to the step-up in fair value of property, plant and equipment	\$ 1,161
Stock compensation expense based on the new capital structure	1,385
	<u>2,546</u>
Adjustments that decrease selling, general and administrative expenses	
Removal of previously recognized depreciation expense recorded by PQ Holdings	(980)
Removal of the stock compensation acceleration clause related to the Business Combination	(1,174)
Removal of stock compensation expense based on the prior capital structure	(2,356)
	<u>(4,510)</u>
Reduction in selling, general and administrative expenses	<u>\$ (1,964)</u>

NOTES TO THE UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the year ended December 31, 2016
(Dollars in thousands)

Below is a summary of the assumptions used to calculate the depreciation expense related to the step-up in fair value of property, plant and equipment:

<u>Asset Class</u>	<u>Fair Value</u>	<u>Estimated Useful Life</u>	<u>Depreciation Adjustment to Selling, General and Administrative Expenses</u>
Land	\$101,337	Indefinite	\$ —
Buildings	112,041	15 to 33 years	176
Machinery and equipment	338,766	3 to 10 years	985
Construction in progress	131,529		—
	<u>\$683,673</u>		<u>\$ 1,161</u>

- (6) Represents the amortization expense associated with the step-up of intangible assets of \$9,437, less the adjustment of previously recognized amortization expense recorded by legacy PQ of \$8,536, for the pre-Business Combination period from January 1, 2016 through May 3, 2016. Amortization expense related to trademarks, technical know-how, contracts and customer relationships is calculated on a straight-line basis over the estimated useful lives of the intangible assets, ranging from five to twenty years.
- (7) Represents the adjustment of transaction fee costs of \$1,795 related to the Business Combination.

Below is a summary of the adjustments (6) and (7) outlined above to other operating expense, net to arrive at the net adjustment recorded in the pro forma statement of operations:

<u>Category</u>	<u>Adjustment</u>
<u>Adjustments that increase other operating expense, net</u>	
(6) Amortization expense related to the step-up in fair value of definite-lived intangible assets	\$ 9,437
<u>Adjustments that decrease other operating expense, net</u>	
(6) Removal of previously recognized amortization expense recorded by PQ Holdings	(8,536)
(7) Removal of one-time transaction fees related to the Business Combination	(1,795)
	<u>(10,331)</u>
Reduction in other operating expense, net	<u>\$ (894)</u>

NOTES TO THE UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the year ended December 31, 2016
(Dollars in thousands)

Below is a summary of the assumptions used to calculate the amortization expense related to the step-up in fair value of definite-lived intangible assets:

	<u>Amount</u>	<u>Weighted-Average Expected Useful Life (in years)</u>	<u>Amortization Adjustment to Other Operating Expense, Net</u>
Intangible assets subject to amortization:			
Trademarks	\$ 35,400	15	\$ 784
Technical know-how	189,300	20	—
Contracts	19,800	5.3	—
Customer relationships	268,700	10.6	8,653
In-process research and development	<u>\$ 6,800</u>		<u>\$ —</u>
Total intangible assets subject to amortization	520,000		9,437
Tradenames, not subject to amortization	151,100	Indefinite	—
Trademarks, not subject to amortization	<u>82,900</u>	Indefinite	<u>—</u>
Total	<u>\$754,000</u>		<u>\$ 9,437</u>

- (8) Represents the amortization on the acquisition accounting adjustments for identifiable intangible assets of \$2,211, less the adjustment of previously recognized amortization expense recorded by legacy PQ of \$796 and the adjustment of \$31,159 of non-recurring charges related to the step-up in fair value of inventory for our Zeolyst Joint Venture, for the pre-Business Combination period from January 1, 2016 through May 3, 2016. The adjustment related to the step-up in fair value of inventory for our Zeolyst Joint Venture is calculated by analyzing the historical inventory turnover rates and average profit margins of each component of our Zeolyst Joint Venture's inventory to calculate a rate that is applied to each such component to determine a fair value as of the date of the Business Combination.

<u>Category</u>	<u>Adjustment</u>
<u>Adjustments that increase equity in net loss (income) from affiliated companies</u>	
Removal of previously recognized amortization expense on definite-lived intangible assets related to our Zeolyst Joint Venture	\$ (796)
Removal of the non-recurring post-Business Combination step-up in fair value of inventory related to our Zeolyst Joint Venture	<u>(31,159)</u>
	(31,955)
<u>Adjustments that decrease equity in net loss (income) from affiliated companies</u>	
Amortization expense related to the step-up of fixed and definite-lived intangible assets	<u>2,211</u>
Increase in equity in net loss (income) from affiliated companies	<u>\$ (29,744)</u>

- (9) Represents interest expense of \$56,480 associated with our senior secured credit facilities less the adjustment of \$36,371 in interest expense related to the legacy debt structure for the period of January 1, 2016 through May 3, 2016. Also represents amortization of deferred financing fees and original issue discount of \$2,179 associated with our senior secured credit facilities less the adjustment of \$2,873 in deferred financing fees and original issue discount related to the legacy debt structure for the period of January 1, 2016 through May 3, 2016.

NOTES TO THE UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the year ended December 31, 2016
(Dollars in thousands)

	Amount	Interest Rate	Interest Payment	Amortization of		Total Interest Expense
				OID	Deferred Financing Fees	
U.S. dollar-denominated term loan facility	\$ 900,000	5.25%	\$ 17,106	\$ 614	\$ 464	\$ 18,184
Euro-denominated term loan facility	300,000	5.00%	5,037	204	133	5,374
6.75% Senior Secured Notes due 2022	625,000	6.75%	13,945	118	208	14,271
Floating Rate Senior Unsecured Notes due 2022	\$ 525,000	11.75%	\$ 20,392	\$ 401	\$ 37	\$ 20,830
Total debt	\$2,350,000		\$56,480	\$1,337	\$ 842	\$ 58,659
						Less historical interest expense of PQ Holdings Inc. (39,244)
						Less historical interest expense of Eco Services (9,095)
						Increase to pro forma interest expense <u>\$ 10,320</u>

A 1/8% increase or decrease in the respective base interest rates underlying the company's variable-rate debt would result in an increase or decrease, as applicable, in pro forma interest expense associated with the company's interest payments of approximately \$698 for the period from January 1, 2016 through May 3, 2016. However, each of the respective base interest rates underlying the company's variable-rate debt at the time of the Business Combination was subject to a floor such that a decrease in the respective base interest rates would have no impact on interest expense.

- (10) Represents the write-off of existing deferred financing fees and original issue discount of \$21,145 related to the legacy debt structure incurred prior to the Business Combination and related financing transactions.
- (11) Includes the write-off of \$26,250 in prepayment penalties associated with the refinancing of the legacy PQ and legacy Eco debt.
- (12) Includes the write-off of \$4,747 in refinancing charges.
- (13) Represents the tax effect of the adjustments noted above, including \$298 related to the change in tax status of Eco from a limited liability company to a C-corporation, which represents the tax provision had Eco been treated as a C-corporation for the period from January 1, 2016 through May 3, 2016. Each adjustment noted above was tax effected at the company's statutory rate in effect for the applicable jurisdiction as of December 31, 2016. Eco's weighted average statutory rate used to calculate the change in tax status was 37.25%.

NOTES TO THE UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the year ended December 31, 2016
(Dollars in thousands)

- (14) The pro forma adjustments to historical interest expense to reflect the redemption of \$ million in aggregate principal amount of PQ Corporation's Floating Rate Senior Unsecured Notes as of January 1, 2016 are as follows:

<u>Interest Expense</u>	<u>Amount</u>
Pro forma interest expense from January 1, 2016 through May 3, 2016	\$
Pro forma OID from January 1, 2016 through May 3, 2016	
Pro forma deferred financing fees from January 1, 2016 through May 3, 2016	_____
Total pro forma interest expense from January 1, 2016 through May 3, 2016	
Interest expense from May 4, 2016 through December 31, 2016	
OID from May 4, 2016 through December 31, 2016	
Deferred financing fees from May 4, 2016 through December 31, 2016	_____
Total interest expense from May 3, 2016 through December 31, 2016	
Total interest expense	\$ =====

- (15) Reflects the tax effect of the pro forma adjustments at an estimated statutory tax rate of %.
- (16) The number of Class A and Class B shares used to compute pro forma basic and diluted net (loss) per share is the number of shares outstanding as of December 31, 2016. Class B shares are considered preferential participating securities and will not be allocated any losses in the periods of net losses, but will be allocated income in the periods of net income. As a result, pro forma basic and diluted (loss) per share have not been computed for Class B shares.
- (17) Reflects the reclassification of our Class A common stock into our common stock, the -for-1 split of our common stock and the conversion of our Class B common stock into our common stock. See "The Reclassification."

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UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the six months ended June 30, 2017
(Dollars in thousands, except per share data)

	Six months ended June 30, 2017	Adjustments Related to the Offering and Reclassification	Pro Forma for the Offering and Reclassification
Sales	\$ 722,198	\$ —	\$ 722,198
Cost of goods sold	532,072	—	532,072
Gross profit	190,126	—	190,126
Selling, general and administrative expenses	69,738	—	69,738
Other operating expense, net	27,324	—	27,324
Operating income	93,064	—	93,064
Equity in net income from affiliated companies	(14,622)	—	(14,622)
Interest expense	94,961	(1)	—
Other expense, net	16,613	—	16,613
Loss before income taxes and noncontrolling interest	(3,888)	—	—
Provision for income taxes	97	(2)	—
Net loss	(3,985)	—	—
Less: Net income attributable to the noncontrolling interest	78	—	78
Net loss attributable to the Combined Business	<u>\$ (4,063)</u>	<u>\$ —</u>	<u>\$ —</u>
Class B shares⁽³⁾			
Net (loss) per share, basic and diluted	—	—	—
Weighted average shares outstanding, basic and diluted	6,679,077	—	—
Class A shares⁽³⁾			
Net (loss) per share, basic and diluted	\$ (9.45)	—	—
Weighted average shares outstanding, basic and diluted	429,985	—	—
Common stock⁽⁴⁾			
Net (loss) per share, basic and diluted	—	—	\$ —
Weighted average shares outstanding, basic and diluted	—	—	—

NOTES TO THE UNAUDITED PRO FORMA STATEMENT OF OPERATIONS
For the six months ended June 30, 2017
(Dollars in thousands)

- (1) The pro forma adjustments to historical interest expense to reflect the redemption of \$ _____ million in aggregate principal amount of PQ Corporation's Floating Rate Senior Unsecured Notes as of January 1, 2016 are as follows:

Interest Expense:	Historical As Reported Six Months Ended June 30, 2017	Adjustments Related to the Offering	Pro Forma for the Offering
U.S. dollar-denominated term loan facility	\$ 24,383	\$ —	\$ 24,383
Euro-denominated term loan facility	7,715	—	7,715
6.75% Senior Secured Notes due 2022	21,094	—	21,094
Floating Rate Senior Unsecured Notes due 2022	31,248	(a)	
8.5% Senior Notes due 2022	8,500	—	8,500
ABL revolving credit facility	1,064	—	1,064
Deferred financing fees and original issue discount	4,222	(b)	
Capitalized interest	(3,519)	—	(3,519)
Other	254	—	254
	<u>\$ 94,961</u>	<u>\$ _____</u>	<u>\$ _____</u>

- (a) Elimination of historical interest expense related to PQ Corporation's Floating Rate Senior Unsecured Notes that was incurred during the six months ended June 30, 2017, as the proceeds from this offering will be used to redeem \$ _____ million in aggregate principal amount of such notes, which accrued interest at an annual rate of 11.75%.
- (b) Reduce amortization of deferred financing costs and original issue discount to reflect the redemption of \$ _____ million in aggregate principal amount of PQ Corporation's Floating Rate Senior Unsecured Notes.
- (2) Reflects the tax effect of the pro forma adjustments at an estimated statutory tax rate of 38.1%.
- (3) The number of Class A and Class B shares used to compute basic and diluted net (loss) per share is the number of shares outstanding as of June 30, 2017. Class B shares are considered preferential participating securities and will not be allocated any losses in the periods of net losses, but will be allocated income in the periods of net income. As a result, basic and diluted (loss) per share have not been computed for Class B shares.
- (4) Reflects the reclassification of our Class A common stock into our common stock, the _____-for-1 split of our common stock and the conversion of our Class B common stock into our common stock. See "The Reclassification."

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UNAUDITED PRO FORMA BALANCE SHEET
As of June 30, 2017
(Dollars in thousands)

	PQ Group Holdings Inc.	Adjustments Related to the Offering and Reclassification	Pro Forma for the Offering and Reclassification
ASSETS			
Cash and cash equivalents	\$ 50,457	\$ (1)	\$
Receivables, net	224,605	—	224,605
Inventories	236,508	—	236,508
Prepaid and other current assets	26,804	—	26,804
Total current assets	538,374		
Investments in affiliated companies	467,670	—	467,670
Property, plant and equipment, net	1,203,925	—	1,203,925
Goodwill	1,294,675	—	1,294,675
Other intangible assets, net	808,851	—	808,851
Other long-term assets	76,536	—	76,536
Total assets	<u>\$ 4,390,031</u>	<u>\$</u>	<u>\$</u>
LIABILITIES			
Notes payable and current maturities of long-term debt	\$ 86,335	\$ —	\$ 86,335
Accounts payable	128,183	—	128,183
Accrued liabilities	75,052	(2)	
Total current liabilities	289,570		
Long-term debt	2,589,713	(3)(4)	
Deferred income taxes	323,033		
Other long-term liabilities	123,299	—	123,299
Total liabilities	<u>3,325,615</u>	<u>—</u>	<u>—</u>
EQUITY			
Common stock, Class B (\$0.01 par); authorized shares 30,000,000; issued shares 6,727,685; outstanding shares 6,711,756	67	—(5)	67
Common stock, Class A (\$0.01 par); authorized shares 160,500,000; issued shares 627,251; outstanding shares 625,172	6	—(5)	6
Common stock (\$0.01 par); authorized shares ; issued shares ; outstanding shares	—	(5)	
Additional paid-in capital	1,169,965	(6)	
Accumulated deficit	(94,443)	(7)	
Treasury stock, at cost; shares 15,929 (Class B) and 2,079 (Class A)	(239)	—	—
Treasury stock, at cost; shares (Common stock)	—	(5)	
Accumulated other comprehensive loss	(15,798)	—	(15,798)
Total PQ Group Holdings Inc. equity	1,059,558		
Noncontrolling interest	4,858	—	4,858
Total equity	<u>1,064,416</u>	<u>—</u>	<u>—</u>
Total liabilities and equity	<u>\$ 4,390,031</u>	<u>\$</u>	<u>\$</u>

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NOTES TO THE UNAUDITED PRO FORMA BALANCE SHEET
As of June 30, 2017
(Dollars in thousands, except per share data)

- (1) To reflect adjustments made to cash for the following:

Proceeds from this offering	\$
Less: underwriting discount	
Less: estimated fees and expenses related to this offering	
Less: repayment of \$ million aggregate principal amount of Floating Rate Senior Unsecured Notes	
Less: prepayment premium due upon repayment of \$ million aggregate principal amount of Floating Rate Senior Unsecured Notes	
Less: payment of \$ of accrued interest on the \$ million aggregate principal amount of Floating Rate Senior Unsecured Notes	
	\$

- (2) To reflect the payment of accrued interest of \$ related to the redemption of \$ million aggregate principal amount of PQ Corporation’s Floating Rate Senior Unsecured Notes.
- (3) To reflect the write-off of deferred financing costs of \$ in connection with the redemption of \$ million aggregate principal amount of PQ Corporation’s Floating Rate Senior Unsecured Notes.
- (4) To reflect the redemption of \$ million aggregate principal amount of PQ Corporation’s Floating Rate Senior Unsecured Notes, net of unamortized original issue discount of \$.

Below is a summary of the effect on long-term debt related to the redemption of \$ million aggregate principal amount of PQ Corporation’s Floating Rate Senior Unsecured Notes:

Redemption of \$ million aggregate principal amount of Floating Rate Senior Unsecured Notes	\$
Write-off of original issue discount	
Write-off of deferred financing costs	
	\$

- (5) To reflect the conversion of the Class B common stock based on its preferential distribution amount. See “The Reclassification.” The adjustment to common stock is calculated as follows:

Class B shares outstanding as of June 30, 2017	
Class B conversion factor ^(a)	
Converted Class B shares as of June 30, 2017	
Par value per share	\$0.01
Converted Class B shares, par value (in thousands)	\$

(a) Assumes a conversion factor equal to the midpoint of the price range set forth on the cover of this prospectus.

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NOTES TO THE UNAUDITED PRO FORMA BALANCE SHEET
As of June 30, 2017
(Dollars in thousands, except per share data)

(6) The adjustments to additional paid-in capital are summarized as follows:

Proceeds from this offering ^(a)	\$
Less: estimated fees and expenses related to this offering	_____
Net proceeds from this offering	_____
Less: Par value of common stock issued in this offering ^(b)	_____
Total adjustment to additional paid-in capital	\$ =====

(a) To reflect the issuance of _____ shares of our common stock offered at an assumed initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus.

(b) To reflect the reclassification to common stock of the par value of \$0.01 per share for the _____ shares of our common stock issued in this offering.

(7) To reflect a \$ _____ after-tax loss on debt extinguishment and \$ _____ in expenses, as shown below:

Write-off of original issue discount related to the Floating Rate Senior Unsecured Notes due 2022	_____
Write-off of deferred financing costs related to the Floating Rate Senior Unsecured Notes due 2022	_____
Prepayment premium related to the Floating Rate Senior Unsecured Notes due 2022	_____
Loss on debt extinguishment before income taxes	_____
Other expenses	_____
Total debt extinguishment and other expenses, before income taxes	_____
Tax benefit at an estimated statutory rate of 38.1%	_____
	\$ =====

SELECTED CONSOLIDATED FINANCIAL DATA OF PQ GROUP HOLDINGS

The following tables set forth our selected historical consolidated financial data as of and for the periods indicated.

On May 4, 2016, we consummated the Business Combination to reorganize and combine the business of legacy PQ and legacy Eco under a new holding company, PQ Group Holdings. Investment funds affiliated with CCMP held a controlling interest in legacy Eco prior to the Business Combination. Legacy Eco is treated as the acquirer in the Business Combination and the predecessor to PQ Group Holdings for accounting purposes.

Legacy Eco operated as a business unit of Solvay until the acquisition of substantially all of the assets of Solvay's Eco Services business unit by Eco on December 1, 2014, and therefore, the financial statements of legacy Eco contained in this prospectus for periods prior to the 2014 Acquisition are not necessarily indicative of what legacy Eco's financial position, results of operations and cash flows would have been had legacy Eco operated as a separate, standalone entity independent of Solvay. In connection with the 2014 Acquisition, the acquisition method of accounting was applied, and the assets and liabilities of legacy Eco were adjusted to fair value on December 1, 2014. Accordingly, with respect to the historical financial and related information of legacy Eco included in this prospectus, references to "Predecessor" include each of the periods from January 1, 2012 to November 30, 2014. For 2014, the results include 11 months of legacy Eco operating activity (January 1, 2014 to November 30, 2014) and include amounts that have been "carved out" from Solvay's financial statements using assumptions and allocations made by Solvay to reflect Solvay's Eco Services business unit on a stand-alone basis. References in this prospectus to "Successor" refer to the period from inception of Eco (July 30, 2014) to December 31, 2014, but only include one month of legacy Eco operating activity (December 1, 2014 to December 31, 2014), because there was no operating activity for the period from inception (July 30, 2014) to November 30, 2014, and reflects legacy Eco on a stand-alone basis.

The consolidated statement of operations data and cash flows data for the years ended December 31, 2016 and 2015, the Successor period from inception (July 30, 2014) to December 31, 2014 and Predecessor period from January 1, 2014 to November 30, 2014, and the consolidated balance sheet data as of December 31, 2016 and 2015 were derived from our audited consolidated financial statements included elsewhere in this prospectus. The consolidated statement of operations data and cash flows data for the six months ended June 30, 2017 and 2016 and the consolidated balance sheet data as of June 30, 2017 were derived from our unaudited consolidated financial statements included elsewhere in this prospectus. The consolidated statement of operations data and cash flows data for the years ended December 31, 2013 and 2012 and the consolidated balance sheet data as of December 31, 2014, 2013 and 2012 were derived from our combined financial statements not included in this prospectus.

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The selected historical consolidated financial data set forth below does not give pro forma effect to the Reclassification, the Business Combination or the 2014 Acquisition and should be read in conjunction with the disclosures set forth under “Capitalization,” “Unaudited Pro Forma Financial Information of PQ Group Holdings,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and the related notes thereto included elsewhere in this prospectus.

	Six months ended June 30,		Year ended December 31,		Successor	Predecessor		
	Unaudited				Period from inception (July 30, 2014) to December 31, 2014	Period from January 1, 2014 to November 30, 2014	Year ended December 31,	
	2017	2016	2016	2015	2014	2014	2013	2012
(Dollars in thousands)								
Statement of operations data:								
Sales	\$722,198	\$371,467	\$1,064,177	\$ 388,875	\$ 35,539	\$ 361,823	\$ 390,834	\$ 410,369
Cost of goods sold	532,072	283,068	810,085	278,791	30,160	265,829	286,371	294,754
Gross profit	190,126	88,399	254,092	110,084	5,379	95,994	104,463	115,615
Selling, general and administrative expenses	69,738	38,014	107,601	34,613	2,623	45,168	46,871	53,617
Other operating expense, net	27,324	25,588	62,301	19,696	16,347	5,593	—	—
Operating income (loss)	93,064	24,797	84,190	55,775	(13,591)	45,233	57,592	61,998
Equity in net (income) loss from affiliated companies	(14,622)	4,693	2,612	—	—	—	—	—
Interest expense, net	94,961	45,752	140,315	44,348	8,470	86	122	179
Debt extinguishment costs	—	11,858	13,782	—	—	—	—	—
Other (income) expense, net	16,613	3,024	(3,402)	—	—	—	(3,266)	(13,000)
(Loss) income before income taxes and noncontrolling interest	(3,888)	(40,530)	(69,117)	11,427	(22,061)	45,147	60,736	74,819
(Benefit) provision for income taxes	97	39,549	10,041	—	—	14,602	21,445	26,342
Net (loss) income	(3,985)	(80,079)	(79,158)	11,427	(22,061)	30,545	39,291	48,477
Less: Net income attributable to the noncontrolling interest	78	314	588	—	—	—	—	—
Net (loss) income attributable to PQ Group Holdings Inc.	<u>\$ (4,063)</u>	<u>\$ (80,393)</u>	<u>\$ (79,746)</u>	<u>\$ 11,427</u>	<u>\$ (22,061)</u>	<u>\$ 30,545</u>	<u>\$ 39,291</u>	<u>\$ 48,477</u>

	Six months ended June 30,		Year ended December 31,		Successor
	Unaudited				Period from inception (July 30, 2014) to December 31, 2014
	2017	2016	2016	2015	2014
Earnings (loss) per share:					
Basic					
Class B shares	\$ —	\$ —	\$ —	\$ 7.58	\$ (14.78)
Class A shares	(9.45)	(186.90)	(185.43)	—	—
Diluted					
Class B shares	—	—	—	7.58	(14.78)
Class A shares	(9.45)	(186.90)	(185.43)	—	—
Weighted average shares outstanding:					
Basic					
Class B shares	6,679,077	3,224,645	4,947,982	1,507,719	1,492,682
Class A shares	429,985	430,136	430,051	—	—
Diluted					
Class B shares	6,679,077	3,224,645	4,947,982	1,507,719	1,492,682
Class A shares	429,985	430,136	430,051	—	—

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	Six months ended June 30, 2017 <i>Unaudited</i>	Year ended December 31,		Successor	Predecessor		
		2016		2015	Year ended December 31,		
					Period from inception (July 30, 2014) to December 31, 2014	Period from January 1, 2014 to November 30, 2014	2013
(Dollars in thousands)							
Balance sheet data (at end of period):							
Cash and cash equivalents	\$ 50,457	\$ 70,742	\$ 25,155	\$ 22,627		\$ —	\$ —
Net working capital (deficit)(1)	198,347	179,544	(9,895)	(16,173)		10,954	13,479
Property, plant and equipment, net	1,203,925	1,181,388	481,073	472,156		345,041	336,631
Total assets	4,390,031	4,259,671	1,007,636	1,025,094		742,046	756,291
Total liabilities	3,325,615	3,231,727	772,343	807,270		201,831	214,788
Total debt, net of original issue discount and deferred financing costs including current portion	2,676,048	2,562,198	673,101	675,254		—	—
Total stockholders' equity	1,064,416	1,027,944	235,293	217,824		540,215	541,503
Cash flows data:							
Net cash provided by (used in):							
Operating activities	\$ 21,751	\$ 119,720	\$ 44,715	\$ (2,057)	\$ 57,593	\$ 84,448	\$ 81,195
Investment activities	(103,556)	(1,929,680)	(38,725)	(888,347)	(32,852)	(41,703)	(40,980)
Financing activities	66,817	1,861,433	(3,462)	913,031	(24,741)	(42,745)	(40,215)
Effect of exchange rate changes	(5,299)	(5,886)	—	—	—	—	—

	Six months ended June 30,		Year ended December 31,		Successor	Predecessor	
	2017		2016		2014	Year ended December 31,	
						Period from January 1, 2014 to November 30, 2014	2013
(Dollars in thousands)							
Segment Sales:							
Performance Materials & Chemicals	\$488,709	\$173,648	\$ 638,951	\$ —	\$ —	\$ —	\$ —
Environmental Catalysts & Services(2)	235,273	198,219	426,747	388,875	35,539	361,823	390,834
Segment Adjusted EBITDA(3):							
Performance Materials & Chemicals	\$118,856	\$ 46,574	\$ 158,679	\$ —	\$ —	\$ —	\$ —
Environmental Catalysts & Services	120,678	78,703	196,825	117,704	9,122	98,075	105,499

(1) Net working capital (deficit) is defined as current assets minus current liabilities minus cash and cash equivalents

(2) Excludes the company's proportionate share of total net sales from the Zeolyst Joint Venture, which we account for as an equity method investment in accordance with GAAP. The proportionate share of total net sales from the Zeolyst Joint Venture is \$63,369 and \$94,516 for the six months ended June 30, 2017 and for the year ended December 31, 2016, respectively.

(3) Segment Adjusted EBITDA is exclusive of corporate expenses. See "Prospectus Summary—Summary Historical and Unaudited Pro Forma Financial and Other Data."

SUPPLEMENTAL SELECTED CONSOLIDATED FINANCIAL DATA OF LEGACY PQ

The following tables set forth certain selected consolidated financial data as of and for the periods indicated for legacy PQ on a stand-alone basis. The consolidated statement of operations data and cash flows data for the years ended December 31, 2015, 2014 and 2013 and the consolidated balance sheet data as of December 31, 2015 and 2014 were derived from legacy PQ's audited consolidated financial statements included elsewhere in this prospectus. The consolidated statement of operations data and cash flows data for the year ended December 31, 2012 and the consolidated balance sheet data as of December 31, 2013 and 2012 were derived from legacy PQ's consolidated financial statements not included in this prospectus. The consolidated statement of operations data and cash flows data for the three months ended March 31, 2016 and the consolidated balance sheet data as of March 31, 2016 were derived from legacy PQ's unaudited consolidated financial statements included elsewhere in this prospectus.

The selected consolidated financial data set forth below should be read in conjunction with the "Unaudited Pro Forma Financial Information of PQ Group Holdings," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the consolidated financial statements and the related notes thereto included elsewhere in this prospectus.

(Dollars in thousands)	<u>Legacy PQ</u>	<u>Legacy PQ</u>			
	<u>Three months ended</u>	<u>Year ended December 31,</u>			
	<u>March 31,</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>
	<u>2016</u>				
	<u>unaudited</u>				
Statement of operations data:					
Sales	\$ 237,393	\$ 1,024,326	\$ 1,114,904	\$ 1,085,019	\$ 1,084,782
Cost of goods sold	173,613	748,756	818,483	795,416	803,159
Gross profit	63,780	275,570	296,421	289,603	281,623
Selling, general and administrative expenses	28,524	107,097	110,886	111,229	112,138
Other operating expense, net	11,461	51,516	71,148	49,373	42,261
Operating income	23,795	116,957	114,387	129,001	127,224
Equity in net income from affiliated companies	4,659	45,325	29,359	53,808	26,206
Interest expense, net	26,413	108,375	111,553	120,347	111,228
Debt extinguishment costs	—	—	2,476	20,287	20,063
Other expense, net	(3,422)	21,383	23,886	3,316	(3,751)
Income before income taxes and noncontrolling interest	5,463	32,524	5,831	38,859	25,890
Provision for income taxes	3,904	22,902	7,548	10,608	18,918
Net income (loss)	1,559	9,622	(1,717)	28,251	6,972
Less: Net income attributable to the noncontrolling interest	457	1,771	1,894	1,521	1,788
Net income (loss) attributable to Legacy PQ	<u>\$ 1,102</u>	<u>\$ 7,851</u>	<u>\$ (3,611)</u>	<u>\$ 26,730</u>	<u>\$ 5,184</u>
Balance sheet data (at end of period):					
Cash and cash equivalents	\$ 44,195	\$ 53,507	\$ 100,836	\$ 117,749	\$ 124,451
Net working capital (1)	157,925	140,887	135,247	153,980	150,235
Property, plant and equipment, net	576,534	569,168	546,716	510,345	496,242
Total assets	2,293,912	2,268,084	2,310,262	2,379,308	2,333,480
Total liabilities	2,207,911	2,191,967	2,212,714	2,232,422	2,216,117
Total debt, including current portion	1,820,012	1,803,763	1,807,404	1,809,201	1,781,449
Total stockholders' equity	86,001	76,117	97,548	146,886	117,363

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(Dollars in thousands)	Legacy PQ	Legacy PQ			
	Three months ended	Year ended December 31,			
	March 31,	2015	2014	2013	2012
	2016				
	unaudited				
Cash flows data:					
Net cash provided by (used in):					
Operating activities	\$ 6,229	\$ 98,896	\$ 120,410	\$ 115,898	\$ 84,971
Investment activities	(29,505)	(125,144)	(114,032)	(125,358)	(66,208)
Financing activities	13,912	(10,379)	(14,787)	6,929	(943)
Effect of exchange rate changes on cash	52	(10,702)	(8,504)	(4,171)	(1,770)

(1) Net working capital is defined as current assets minus current liabilities minus cash and cash equivalents.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The statements in the discussion and analysis regarding industry outlook, our expectations regarding the performance of our business and the forward-looking statements are subject to numerous risks and uncertainties, including, but not limited to, the risks and uncertainties described in "Risk Factors" and "Cautionary Note Regarding Forward-Looking Statements." Our actual results may differ materially from those contained in or implied by any forward-looking statements. You should read the following discussion together with the sections entitled "Risk Factors," "Prospectus Summary—Summary Historical and Unaudited Pro Forma Financial and Other Data," "Selected Consolidated Financial Data of PQ Group Holdings," "Unaudited Pro Forma Financial Information of PQ Group Holdings" and the historical audited and unaudited consolidated financial statements, including the related notes, appearing elsewhere in this prospectus. All references to years, unless otherwise noted, refer to our fiscal years, which end on December 31. All dollar values in this section, unless otherwise noted, are denoted in millions.

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 June 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, 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" or "the company"), 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

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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 the issuer, PQ Group Holdings, in this prospectus, 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.

	Six months ended June 30,		Pro forma year ended December 31, 2016	Years ended December 31,		Successor	Predecessor
	2017	2016		2016	2015	Period from inception (July 30, 2014) to December 31, 2014	Period from January 1, 2014 to November 30, 2014
Operations of legacy Eco	Included	Included	Included	Included	Included	Partially included (December 1 to December 31)	Included (January 1 to November 30)
Operations of legacy PQ	Included	Partially included (May 4 to June 30)	Included	Partially included (May 4 to December 31)	Not included	Not included	Not included

The financial statements of our accounting predecessor contained in this prospectus for periods prior to the 2014 Acquisition are not necessarily indicative of what legacy Eco’s financial position, results of operations and cash flows would have been had legacy Eco operated as a separate, standalone entity independent of Solvay.

Key Performance Indicator

Adjusted EBITDA

Adjusted EBITDA is a non-GAAP financial measure that we use to evaluate our past performance. Adjusted EBITDA 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. 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 and (ii) the impact of certain non-cash or other items that are included in net income and EBITDA that we do not consider indicative of our ongoing operating performance. We believe that these adjustments provide investors with meaningful information to understand our operating results and ability to analyze our financial and business trends on a period-to-period basis.

You should not consider Adjusted EBITDA in isolation or as an alternative to (a) operating profit or profit for the period (as reported in accordance with GAAP), (b) cash flows from operating, investing and financing activities as a measure to meet our cash needs or (c) any other measures of performance under GAAP. You should exercise caution in comparing Adjusted EBITDA as reported by us to similar measures of other

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companies. In evaluating Adjusted EBITDA, 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 should not be construed as an inference that our future results will be unaffected by unusual or nonrecurring items. For a discussion of additional limitations of Adjusted EBITDA as well as a reconciliation from net income (loss) for the periods presented to EBITDA and Adjusted EBITDA, see “Prospectus Summary—Summary Historical and Unaudited Pro Forma Financial and Other Data.”

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. We have seen recent declines in the pulp and paper and oil and gas end uses. 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 years ended December 31, 2016 and 2015, approximately 45% of sales with our largest sodium silicate customers in North America are 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% and 91% of our refining services product group pro forma sales for the years ended December 31, 2016 and 2015, respectively, 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

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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

Our results of operations are subject to seasonal fluctuations, primarily with respect to our performance materials and refining services product groups. As the road striping season occurs during warmer weather, sales, and earnings are primarily generated during the second and third quarters in our performance materials product group. Our refining services product group typically experiences similar seasonal fluctuations as a result of higher demand for gasoline products in the summer months. Working capital is built during the first half of the year, while cash generation occurs primarily in the second half of the fiscal 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 39% and 34% of our sales for the six months ended June 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. See “—Quantitative and Qualitative Disclosures about Market Risk—Foreign Exchange Risk.”

Public Company Costs

As a result of this offering, we expect to incur additional legal, accounting and other expenses that we did not previously incur, including costs associated with SEC reporting and corporate governance requirements. These requirements include compliance with the Sarbanes-Oxley Act and the listing standards of the New York Stock Exchange. Our financial statements following this offering will reflect the impact of these expenses.

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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 six months ended June 30, 2016 as well as the years ended December 31, 2016 and 2015. 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 prospectus.

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.

Management believes 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.

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Results of Operations

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

Highlights

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

Sales

- ***Historical:*** Net sales increased \$350.7 million, or 94.4%, to \$722.2 million. The increase in sales was primarily due to the inclusion of \$524.1 million of legacy PQ sales in our results of operations for the six months ended June 30, 2017 as compared to \$184.8 million of legacy PQ sales included in our results of operations for the period of May 4, 2016 through June 30, 2016.
- ***Pro Forma:*** Net sales increased \$11.9 million, or 1.7%, to \$722.2 million. The increase in sales was primarily due to favorable pricing and customer mix in both performance materials and chemicals and environmental catalysts and services and favorable volumes within performance materials and chemicals. This was partially offset by the unfavorable effect of foreign currency translation.

Gross Profit

- ***Historical:*** Gross profit increased \$101.7 million, or 115.0%, to \$190.1 million. Our increase in gross profit was primarily due to the inclusion of \$122.9 million of legacy PQ gross profit in our results of operations for the six months ended June 30, 2017 as compared to \$30.2 million of legacy PQ gross profit included in our results of operations for the period of May 4, 2016 through June 30, 2016.
- ***Pro Forma:*** Gross profit decreased \$3.7 million, or 1.9%, to \$190.1 million. Our decrease in gross profit was primarily due to higher manufacturing costs and depreciation expense in performance materials and chemicals, which was partially offset by favorable pricing in both performance materials and chemicals and environmental catalysts and services.

Operating Income

- ***Historical:*** Operating income increased \$68.3 million, or 275.4%, to \$93.1 million. Our increase in operating income was primarily due to the inclusion of \$41.9 million of legacy PQ operating income in our results of operations for the six months ended June 30, 2017 as compared to the inclusion of \$0.7 million of legacy PQ operating loss in our results of operations for the period of May 4, 2016 through June 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 \$15.7 million, or 20.3%, to \$93.1 million. Our increase in operating income was primarily due to lower selling, general and administrative and other operating expenses, which was partially offset by lower gross profit, as described above. The lower other operating expenses were a result of lower restructuring and severance related costs.

Equity in Net Income of Affiliated Companies

- ***Historical:*** Equity in net income of affiliated companies increased \$19.3 million, or 410.6%, to \$14.6 million. Our increase in equity in net income of affiliated companies was primarily due to the inclusion of \$14.6 million of legacy PQ equity in net income of affiliated companies in our results of operations for the six months ended June 30, 2017 as compared to the inclusion of \$4.7 million of legacy PQ included in our results of operations for the period of May 4, 2016 through June 30, 2016.

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- *Pro Forma*: Equity in net income of affiliated companies increased \$1.1 million, or 8.1%, to \$14.6 million. Our increase in equity in net income of affiliated companies was primarily driven by higher earnings generated by our Zeolyst Joint Venture from higher volumes of pressure products and specialty catalysts, which were partially offset by lower volumes within our hydrocracking product line and various expansion and growth related cost increases.

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 six months ended June 30, 2017 and June 30, 2016. The historical results of operations include Eco for all periods presented and legacy PQ for the six months ended June 30, 2017 and the period of May 4, 2016 through June 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			
	Six months ended June 30,		Change		Six months ended June 30,		Change	
	2017	2016	\$	%	2017	2016	\$	%
	Unaudited	Unaudited			Unaudited	Unaudited		
	(in millions, except percentages)							
Sales	\$ 722.2	\$ 371.5	\$350.7	94.4%	\$ 722.2	\$ 710.3	\$ 11.9	1.7%
Cost of goods sold	532.1	283.1	249.0	88.0%	532.1	516.5	15.6	3.0%
Gross profit	190.1	88.4	101.7	115.0%	190.1	193.8	(3.7)	(1.9)%
Gross profit margin	26.3%	23.8%			26.3%	27.3%		
Selling, general and administrative expenses	69.7	38.0	31.7	83.4%	69.7	75.5	(5.8)	(7.7)%
Other operating expense, net	27.3	25.6	1.7	6.6%	27.3	40.9	(13.6)	(33.3)%
Operating income	93.1	24.8	68.3	275.4%	93.1	77.4	15.7	20.3%
Operating income margin	12.9%	6.7%			12.9%	10.9%		
Equity in net (income) loss of affiliated companies	(14.6)	4.7	(19.3)	(410.6)%	(14.6)	(13.5)	(1.1)	8.1%
Interest expense, net	95.0	45.8	49.2	107.4%	95.0	94.0	1.0	1.1%
Debt extinguishment costs	—	11.9	(11.9)	(100.0)%	—	—	—	—
Other (income) expense, net	16.5	3.0	13.5	450.0%	16.5	(2.5)	19.0	(760.0)%
Income (loss) before income taxes and noncontrolling interest	(3.8)	(40.6)	36.8	(90.6)%	(3.8)	(0.6)	(3.2)	533.3%
Provision for income taxes	0.1	39.5	(39.4)	(99.7)%	0.1	45.8	(45.7)	(99.8)%
Effective tax rate	(2.6)%	(97.3)%			(2.6)%	(7,633.3)%		
Net loss	(3.9)	(80.1)	76.2	(95.1)%	(3.9)	(46.4)	42.5	(91.6)%
Less: Net income attributable to the noncontrolling interest	0.1	0.3	(0.2)	—	0.1	1.0	(0.9)	(90.0)%
Net loss attributable to PQ Group Holdings Inc.	\$ (4.0)	\$ (80.4)	\$ 76.4	(95.0)%	\$ (4.0)	\$ (47.4)	\$ 43.4	(91.6)%

Sales

	Historical				Historical Pro Forma			
	Six months ended June 30,		Change		Six months ended June 30,		Change	
	2017	2016	\$	%	2017	2016	\$	%
	(in millions, except percentages)							
Net Sales:								
Performance Materials & Chemicals	\$488.7	\$173.6	\$315.1	181.5%	\$ 488.7	\$ 481.9	\$ 6.8	1.4%
Environmental Catalysts & Services	235.3	198.2	37.1	18.7%	235.3	229.4	5.9	2.6%
Inter-segment sales eliminations	(1.8)	(0.3)	(1.5)	500.0%	(1.8)	(1.0)	(0.8)	80.0%
Total net sales	\$722.2	\$371.5	\$350.7	94.4%	\$ 722.2	\$ 710.3	\$ 11.9	1.7%

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Historical Sales

Sales for the six months ended June 30, 2017 were \$722.2 million, an increase of \$350.7 million, or 94.4%, compared to sales of \$371.5 million for the six months ended June 30, 2016. The increase in sales within our performance materials and chemicals segment was due to the inclusion of legacy PQ sales of \$488.7 million in our results of operations for the six months ended June 30, 2017 as compared to legacy PQ sales of \$173.6 million in our results of operations for the period of May 4, 2016 through June 30, 2016. The increase in sales within our environmental catalysts and services segment was due to the inclusion of \$37.2 million of legacy PQ sales in our results of operations for the six months ended June 30, 2017 as compared to legacy PQ sales of \$12.1 million in our results of operations for the period of May 4, 2016 through June 30, 2016 and an increase of \$12.0 million in our refining services product group. The increase in our refining services product group was primarily driven by higher average selling prices of \$6.5 million and increased volumes of \$5.5 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 six months ended June 30, 2017 were \$488.7 million, an increase of \$6.8 million, or 1.4%, compared to sales of \$481.9 million for the six months ended June 30, 2016. The increase in sales was primarily due to higher average selling price and customer mix of \$8.6 million and favorable volumes of \$5.2 million, which was partially offset by the unfavorable effects of foreign currency translation of \$7.0 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, an increase in oil drilling, and an increase in European highway as a result of our recent acquisition of Sovitec, which was partially offset by lower North America highway sales volumes due to delays in government spending. The stronger U.S. dollar compared to the British pound and Euro unfavorably impacted our sales.

Environmental Catalysts & Services: Sales in environmental catalysts and services for the six months ended June 30, 2017 were \$235.3 million, an increase of \$5.9 million, or 2.6%, compared to sales of \$229.4 million for the six months ended June 30, 2016. The increase in sales was primarily due to higher average selling price and customer mix of \$8.8 million, which was partially offset by lower volumes of \$2.0 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 and increased prices in the silica catalysts product group, 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 sales volumes to the methyl methacrylate industry in the prior year and lower microspheres sales, which was partially offset by stronger virgin sulfuric acid sales volumes due to the timing of our customer's plant turnarounds. The stronger U.S. dollar compared to the British pound unfavorably impacted our sales.

Gross Profit

Historical: Gross profit for the six months ended June 30, 2017 was \$190.1 million, an increase of \$101.7 million, or 115.0%, compared with \$88.4 million for the six months ended June 30, 2016. The increase in gross profit was due to \$122.9 million attributable to the inclusion of legacy PQ gross profit in our results of operations for the six months ended June 30, 2017 as compared to legacy PQ gross profit of \$30.2 million in our results of operations for the period of May 4, 2016 through June 30, 2016 and an increase of \$9.0 million from our refining services product group. The increase in our refining services gross profit was due to favorable pricing of \$6.5 million and higher volumes of \$3.8 million, which was partially offset by higher depreciation expense of \$2.0 million. The favorable pricing was due to higher realization from sulfuric acid regeneration contract renewals,

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partially offset by unfavorable indexing, which limited our ability to pass through raw materials costs. The increase in volume was driven by higher virgin sulfuric acid product line shipments to the mining industry.

Pro Forma: Gross profit for the six months ended June 30, 2017 was \$190.1 million, a decrease of \$3.7 million, or 1.9%, compared with \$193.8 million for the six months ended June 30, 2016. The decrease in gross profit was due to higher depreciation expense of \$11.6 million, higher manufacturing costs of \$5.2 million, the unfavorable effects of foreign currency translation of \$2.7 million and a decrease in volumes of \$1.3 million, which was partially offset by favorable pricing of \$17.4 million. The higher manufacturing costs were primarily driven by increased costs to build our new Thermodrop product offering which was released for sale towards the end of the second quarter of 2017, and higher production and labor inflation costs. The unfavorable effect of foreign currency translation was driven by the stronger U.S. dollar compared to the British pound and Euro. 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 and indexing, which limited our ability to pass through raw materials costs.

Selling, General and Administrative Expenses

Historical: Selling, general and administrative expenses for the six months ended June 30, 2017 were \$69.7 million, an increase of \$31.7 million, or 83.4%, compared with \$38.0 million for the six months ended June 30, 2016. The increase in selling, general and administrative expenses was due to \$60.1 million attributable to the inclusion of legacy PQ selling, general and administrative expenses in our results of operations for the six months ended June 30, 2017 as compared to legacy PQ selling, general and administrative expenses of \$18.1 million in our results of operations for the period of May 4, 2016 through June 30, 2016. This was partly offset by \$8.1 million of lower selling, general and administrative expenses as a result of cost reduction initiatives.

Pro Forma: Selling, general and administrative expenses for the six months ended June 30, 2017 were \$69.7 million, a decrease of \$5.8 million, or 7.7%, compared with \$75.5 million for the six months ended June 30, 2016. The reduction in selling, general and administrative expenses related to our cost reduction initiatives.

Other Operating Expense, Net

Historical: Other operating expense, net for the six months ended June 30, 2017 was \$27.3 million, an increase of \$1.7 million, or 6.6%, compared with \$25.6 million for the six months ended June 30, 2016. The increase in other operating expense, net was due to \$20.9 million attributable to the inclusion of legacy PQ other operating expense, net in our results of operations for the six months ended June 30, 2017 as compared to legacy PQ other operating expense, net of \$12.7 million in our results of operations for the period of May 4, 2016 through June 30, 2016. This was partly offset by \$5.5 million of lower restructuring and severance related costs.

Pro Forma: Other operating expense, net for the six months ended June 30, 2017 was \$27.3 million, a decrease of \$13.6 million, or 33.3%, compared with \$40.9 million for the six months ended June 30, 2016. The decrease in other operating expense, net was due to \$9.5 million of lower restructuring and severance related costs and \$5.2 million of lower amortization expense.

Equity in Net Income of Affiliated Companies

Historical: Equity in net income of affiliated companies for the six months ended June 30, 2017 was \$14.6 million, an increase of \$19.3 million, or 410.6%, compared with a loss of \$4.7 million for the six months ended June 30, 2016. The increase was primarily due to \$19.4 million of earnings generated by our Zeolyst Joint Venture during the six months ended June 30, 2017 as compared to \$7.7 million for the period of May 4, 2016 through June 30, 2016 and \$7.0 million of lower amortization expense on the fair value step-up of the underlying assets of our Zeolyst Joint Venture.

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Pro Forma: Equity in net income of affiliated companies for the six months ended June 30, 2017 was \$14.6 million, an increase of \$1.1 million, or 8.1%, compared with \$13.5 million for the six months ended June 30, 2016. The increase in earnings generated by our Zeolyst Joint Venture was due to higher pressure products sales from growth in emissions products and custom dewaxing products, of which sales began during the second half of 2016, partly offset by lower hydrocracking volumes to the methyl methacrylate industry.

Interest Expense, Net

Historical: Interest expense, net for the six months ended June 30, 2017 was \$95.0 million, an increase of \$49.2 million, or 107.4%, as compared with \$45.8 million for the six months ended June 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 standalone basis.

Pro Forma: Interest expense, net for the six months ended June 30, 2017 was \$95.0 million, an increase of \$1.0 million, or 1.1%, as compared with \$94.0 million for the six months ended June 30, 2016.

Debt Extinguishment Costs

Historical: Debt extinguishment costs for the six months ended June 30, 2016 were \$11.9 million. 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 (Income) Expense, Net

Historical: Other expense, net was \$16.5 million for the six months ended June 30, 2017, an unfavorable change of \$13.5 million, or 450.0% compared with other expense, net of \$3.0 million for the six months ended June 30, 2016. The change in other expense, net primarily consisted of \$16.4 million of foreign currency losses for the six months ended June 30, 2017 as compared to foreign currency losses of \$3.1 million for the six months ended June 30, 2016.

Pro Forma: Other expense, net was \$16.5 million for the six months ended June 30, 2017, an unfavorable change of \$19.0 million, or 760.0%, compared with other income, net of \$2.5 million for the six months ended June 30, 2016. The change in other income, net primarily consisted of \$16.4 million of foreign currency losses for the six months ended June 30, 2017 as compared to foreign currency gains of \$2.2 million for the six months ended June 30, 2016.

Provision for Income Taxes

Historical: The provision for income taxes for the six months ended June 30, 2017 was \$0.1 million, a decrease of \$39.4 million, or 99.7%, compared to a \$39.5 million provision for the six months ended June 30, 2016. The effective income tax rate for the six months ended June 30, 2017 was (2.6)% compared to (97.3)% for the six months ended June 30, 2016. The difference between the U.S. federal statutory income tax rate and our effective income tax rate for the six months ended June 30, 2017 was mainly due to the tax effect of repatriating foreign earnings back to the United States as dividends offset by lower tax rates in foreign jurisdictions as compared to the U.S. tax rate, foreign withholdings taxes, state taxes and non-deductible transaction costs.

Pro Forma: The provision for income taxes for the six months ended June 30, 2017 was \$0.1 million, a decrease of \$45.7 million, or 99.8%, compared to a \$45.8 million provision for the six months ended June 30, 2016. The effective income tax rate for the six months ended June 30, 2017 was (2.6)% compared to (7,633.3)% for the six months ended June 30, 2016.

The difference between the U.S. federal statutory income tax rate and our effective income tax rate for the six months ended June 30, 2017 was mainly due to the tax effect of repatriating foreign earnings back to the

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United States as dividends offset by lower tax rates in foreign jurisdictions as compared to the U.S. tax rate, foreign withholdings taxes, state taxes and non-deductible transaction costs.

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 \$4.0 million for the six months ended June 30, 2017, a decrease of \$76.4 million, or 95.0%, as compared to a net loss of \$80.4 million for the six months ended June 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 \$4.0 million for the six months ended June 30, 2017, a decrease of \$43.4 million, or 91.6%, as compared to a net loss of \$47.4 million for the six months ended June 30, 2016.

Historical and Pro Forma Adjusted Earnings before Interest, Taxes, Depreciation and Amortization (Adjusted EBITDA)

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

	Historical	Pro Forma	Change	
	Six months ended June 30, 2017	Six months ended June 30, 2016	\$	%
	(dollars in millions)			
Segment Adjusted EBITDA ⁽¹⁾ :				
Performance Materials & Chemicals	\$ 118.9	\$ 119.7	\$(0.8)	(0.7)%
Environmental Catalysts & Services ⁽²⁾	120.7	103.6	17.1	16.5%
Total Segment Adjusted EBITDA ⁽³⁾	239.6	223.3	16.3	7.3%
Corporate	(15.6)	(15.5)	(0.1)	0.6%
Total Adjusted EBITDA ⁽³⁾	\$ 224.0	\$ 207.8	\$16.2	7.8%

- (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 equity in net income included in the environmental catalysts and services segment for our Zeolyst Joint Venture was \$19.8 million and \$16.4 million for the six months ended June 30, 2017 and pro forma six months ended June 30, 2016, respectively
- (3) Our total Segment Adjusted EBITDA differs from our total consolidated Adjusted EBITDA due to unallocated corporate expenses.

Adjusted EBITDA for the six months ended June 30, 2017 was \$224.0 million, an increase of \$16.2 million, or 7.8%, compared with \$207.8 million on a pro forma basis for the six months ended June 30, 2016.

Performance Materials & Chemicals: Adjusted EBITDA for the six months ended June 30, 2017 was \$118.9 million, a decrease of \$0.8 million, or 0.7%, compared with \$119.7 million on a pro forma basis for the six months ended June 30, 2016. The decrease in Adjusted EBITDA was due to the effects of unfavorable foreign currency translation adjustments and higher raw material and variable production costs offset by higher volumes in North America and the Sovitec acquisition.

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Environmental Catalysts & Services: Adjusted EBITDA for the six months ended June 30, 2017 was \$120.7 million, an increase of \$17.1 million, or 16.5%, compared with \$103.6 million on a pro forma basis for the six months ended June 30, 2016. The increase in Adjusted EBITDA was due to higher sales from our Zeolyst Joint Venture, higher realization from sulfuric acid regeneration contract renewals and favorable operating costs from cost reduction initiatives.

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
	Six months ended June 30,	
	2017	2016
(dollars in millions)		
Reconciliation of net loss attributable to PQ Group Holdings Inc. to Segment Adjusted EBITDA		
Net loss attributable to PQ Group Holdings Inc.	\$ (4.0)	\$ (47.4)
Provision for income taxes	0.1	45.8
Interest expense, net	95.0	94.0
Depreciation and amortization	83.2	79.5
EBITDA	174.3	171.9
Joint venture depreciation, amortization and interest ^(a)	5.5	5.2
Amortization of investment in affiliate step-up ^(b)	5.3	3.0
Amortization of inventory step-up ^(c)	0.9	—
Net loss on asset disposals ^(d)	2.9	2.3
Foreign currency exchange loss (gain) ^(e)	16.4	(2.2)
Non-cash revaluation of inventory, including LIFO	2.5	0.5
Management advisory fees ^(f)	2.5	2.8
Transaction and other related costs ^(g)	4.3	3.6
Equity-based and other non-cash compensation	2.8	3.2
Restructuring, integration and business optimization expenses ^(h)	3.1	13.3
Defined benefit plan pension cost ⁽ⁱ⁾	1.4	2.8
Other ^(j)	2.1	1.4
Adjusted EBITDA	224.0	207.8
Unallocated corporate expenses	15.6	15.5
Total Segment Adjusted EBITDA	<u>\$ 239.6</u>	<u>\$ 223.3</u>

- (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 non-permanent intercompany debt denominated in local currency translated to U.S. dollars.

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- (f) Reflects consulting fees paid to CCMP and affiliates of INEOS for consulting services that include certain financial advisory and management services. These payments would cease as of the effective date of our initial public offering.
- (g) Relates to certain transaction costs described in our condensed consolidated financial statements for the quarter ended June 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.
- (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.

Historical and Pro Forma—Year Ended December 31, 2016 Compared to the Year Ended December 31, 2015 (the Pro Forma Discussion Compares the Pro Forma Year Ended December 31, 2016 to the Pro Forma Year Ended December 31, 2015)

Highlights

The following is a summary of our financial performance for the year ended December 31, 2016 compared with the prior year ended December 31, 2015.

Sales

- *Historical:* Net sales increased \$675.3 million to \$1,064.2 million. The increase in sales was primarily due to the inclusion of \$690.5 million of legacy PQ sales included in our results of operations from May 4, 2016 through December 31, 2016, which was partly offset by a decrease of \$15.2 million in sales from our refining services product group.
- *Pro Forma:* Net sales decreased \$10.2 million to \$1,403.0 million. The decrease in sales was primarily due to unfavorable foreign currency exchange variations compared to the same period in the prior year (\$27.3 million), lower refining services pricing, which was primarily due to cost adjusted pass through contracts, and lower volumes in performance materials and chemicals, partially offset by higher volumes and higher average selling price and customer mix improvement in environmental catalysts and services.

Gross Profit

- *Historical:* Gross profit increased \$144.4 million to \$254.1 million. Our increase in gross profit was primarily due to the inclusion of \$142.6 million of legacy PQ gross profit included in our results of operations from May 4, 2016 through December 31, 2016.
- *Pro Forma:* Gross profit increased \$1.4 million to \$365.9 million. The increase in gross profit was driven primarily by favorable volume contribution and lower manufacturing costs in our environmental catalysts and services segment. This was offset by lower environmental catalysts and services pricing, the unfavorable effect of foreign currency translation totaling \$7.6 million and \$44.8 million of higher depreciation and amortization expense as a result of the step-up in asset values due to the Business Combination.

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Operating Income

- *Historical:* Operating income increased by \$28.4 million to \$84.2 million. Our operating income increased due to the inclusion of \$18.0 million of legacy PQ operating income included in our results of operations from May 4, 2016 through December 31, 2016 and \$10.4 million of operating income associated with our refining services product group.
- *Pro Forma:* Operating income decreased \$10.0 million to \$145.9 million. Our operating income decreased due to higher other operating expenses, primarily related to purchase accounting, restructuring, severance, and transaction costs.

Equity in Net (Loss) Income of Affiliated Companies

- *Historical:* Equity in net loss of affiliated companies was \$2.6 million which was primarily due to step up amortization related to our Zeolyst Joint Venture.
- *Pro Forma:* Equity in net income of affiliated companies was \$35.2 million, a decrease of \$5.9 million. The decrease was due to lower earnings generated by our Zeolyst Joint Venture, primarily from lower hydrocracking and specialty catalyst volumes, and due to various expansion and growth related cost increases.

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The following is our consolidated statement of operations and a summary of financial results, presented on a historical and pro forma basis, for the years ended December 31, 2016 and December 31, 2015. The historical results of operations include Eco for all periods presented and legacy PQ from May 4, 2016, the date of consummation of the Business Combination, through December 31, 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				Pro Forma			
	Year ended December 31,		Change		Year ended December 31,		Change	
	2016	2015	\$	%	2016	2015	\$	%
	(in millions, except percentages)							
Sales	\$1,064.2	\$388.9	\$675.3	173.6%	\$ 1,403.0	\$1,413.2	\$(10.2)	(0.7)%
Cost of goods sold	810.1	278.8	531.3	190.6%	1,037.1	1,048.7	(11.6)	(1.1)%
Gross profit	254.1	110.1	144.0	130.8%	365.9	364.5	1.4	0.4%
<i>Gross profit margin</i>	23.9%	28.3%			26.1%	25.8%		
Selling, general and administrative expenses	107.6	34.6	73.0	211.0%	145.0	140.9	4.1	2.9%
Other operating expense, net	62.3	19.7	42.6	216.2%	75.0	67.7	7.3	10.8%
Operating income (loss)	84.2	55.8	28.4	50.9%	145.9	155.9	(10.0)	(6.4)%
<i>Operating income margin</i>	7.9%	14.3%			10.4%	11.0%		
Equity in net (loss) income of affiliated companies	(2.6)	—	(2.6)	—	35.2	41.1	(5.9)	(14.4)%
Interest expense, net	140.3	44.3	96.0	216.7%	187.9	199.6	(11.7)	(5.9)%
Debt extinguishment costs	13.8	—	13.8	—	1.8	—	1.8	—
Other (income) expense, net	(3.4)	—	(3.4)	—	(8.8)	21.3	(30.1)	(141.3)%
(Loss) income before income taxes and noncontrolling interest	(69.1)	11.5	(80.6)	(700.9)%	0.3	(23.9)	24.1	(100.8)%
Provision for income taxes	10.0	—	10.0	—	58.0	1.2	56.8	4,733.3%
<i>Effective tax rate</i>	(14.5)%	0.0%			22,295.0%	(4.8)%		
Net (loss) income	(79.1)	11.5	(90.6)	(787.8)%	(57.7)	(25.1)	(32.7)	130.3%
Less: Net income attributable to the noncontrolling interest	0.6	—	0.6	—	1.2	1.8	(0.6)	(33.3)%
Net (loss) income attributable to PQ Group Holdings Inc.	<u>\$ (79.7)</u>	<u>\$ 11.5</u>	<u>\$ (91.2)</u>	<u>(793.0)%</u>	<u>\$ (59.0)</u>	<u>\$ (26.9)</u>	<u>\$(32.1)</u>	<u>119.3%</u>

Sales

	Historical				Pro Forma			
	Year ended December 31,		Change		Year ended December 31,		Change	
	2016	2015	\$	%	2016	2015	\$	%
	(in millions, except percentages)							
Net Sales:								
Performance Materials & Chemicals	\$ 639.0	\$ —	\$639.0	—	\$ 947.2	\$ 966.1	\$(18.9)	(2.0)%
Environmental Catalysts & Services	426.7	388.9	37.8	9.7%	457.9	447.1	10.8	2.4%
Inter-segment sales eliminations	(1.5)	—	(1.5)	—	(2.1)	—	(2.1)	—
Total net sales	<u>\$1,064.2</u>	<u>\$388.9</u>	<u>\$675.3</u>	<u>173.6%</u>	<u>\$1,403.0</u>	<u>\$1,413.2</u>	<u>\$(10.2)</u>	<u>(0.7)%</u>

Historical Sales

Sales for the fiscal year ended December 31, 2016 were \$1,064.2 million, an increase of \$675.3 million, or 173.6%, compared to sales of \$388.9 million for the year ended December 31, 2015. The increase in sales in our

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performance materials and chemicals segment was due to the inclusion of legacy PQ sales of \$639.0 million in our results of operations for the period from May 4, 2016 to December 31, 2016. The increase in sales within our environmental catalysts and services segment was due to the inclusion of legacy PQ sales totaling \$53.0 million in our results of operations for the period from May 4, 2016 to December 31, 2016, partly offset by a decrease of \$15.2 million in sales from our refining services product group. The decrease in sales from our refining services product group was primarily due to lower pricing of \$29.7 million, partially offset by an increase in volumes of \$14.5 million. The lower pricing was driven by indexing to pass through lower raw material costs, mainly sulfur and natural gas. The higher volume was primarily driven by strong gasoline demand for the refining services product group, partly offset by lower virgin sulfuric acid shipments.

Pro Forma Sales

Performance Materials & Chemicals: Performance materials and chemicals sales for the year ended December 31, 2016 were \$947.2 million, a decrease of \$18.9 million, or 2.0%, compared to sales of \$966.1 million for the year ended December 31, 2015. The decrease in sales was primarily due to the unfavorable effects of foreign currency translation of \$25.1 million, partially offset by higher average selling price and customer mix of \$4.4 million and higher volumes of \$1.8 million.

The increase in volumes in performance materials and chemicals was the result of higher sales in precipitated silicas, spray dry silicate (in Europe) and strong customer demand for our personal care and microsphere products, which was partially offset by lower volumes of zeolite, beer gels, potassium silicate, spray dry silicate in the Americas, and microspheres within the performance materials product line. The lower demand in potassium silicate and spray dry silicate was due to lower drilling activity in North America. The higher average selling price is principally a result of favorable U.S. dollar denominated sales and U.S. dollar cost pass through pricing in certain foreign locations and higher selling prices for transportation safety and certain microsphere products, including hollow microspheres. Lower pricing for our cost adjusted pass through contracts in North America and lower microspheres customer mix partially offset this favorable pricing impact. The stronger U.S. dollar compared to a number of other major currencies, including the Canadian dollar, the Mexican peso, the British pound, and Brazilian real, unfavorably impacted our sales.

Environmental Catalysts & Services: Environmental catalysts and services sales for the year ended December 31, 2016 were \$457.9 million, an increase of \$10.8 million, or 2.4%, compared to sales of \$447.1 million for the year ended December 31, 2015. The increase in sales was primarily due to increased volumes of \$40.2 million, partially offset by lower average selling price, primarily from lower cost pass through pricing of \$27.2 million, and the unfavorable effects of foreign currency translation of \$2.2 million.

Environmental catalysts and services sales were higher from increased sales volumes, which were primarily driven by strong demand across multiple product lines, primarily in our silica catalyst product group serving the packaging and engineered plastics end uses and strong gasoline demand within our refining services product group. Average selling prices in the silica catalysts product group increased from favorable customer mix. This was partially offset by unfavorable indexing to lower pass through raw material costs, mainly sulfur and natural gas.

Gross Profit

Historical Gross Profit

Gross profit for the year ended December 31, 2016 was \$254.1 million, an increase of \$144.0 million, or 130.8% compared with \$110.1 million for the year ended December 31, 2015. The increase in gross profit was due to \$142.6 million attributable to the inclusion of legacy PQ in our results of operations for the period from May 4, 2016 to December 31, 2016 and an increase of \$1.4 million in gross profit from our refining services product group. The increase in refining services gross profit was due to lower manufacturing costs of

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\$30.6 million and higher volumes of \$10.2 million, which was offset by lower pricing and unfavorable customer mix of \$29.7 million and higher depreciation expense of \$9.7 million. The lower manufacturing costs were primarily driven by lower raw material pass through costs, including sulfur and natural gas, and from fixed plant cost reduction activities.

Pro Forma Gross Profit

Gross profit for the year ended December 31, 2016 was \$365.9 million, an increase of \$1.4 million, or 0.4% compared with \$364.5 million for the year ended December 31, 2015. The \$1.4 million of higher gross profit was due to lower manufacturing costs of \$35.5 million and higher volumes of \$15.9 million. The increase in gross profit was offset by increases in depreciation and amortization expense of \$19.0 million, lower average selling price of \$22.8 million, the unfavorable effects of foreign currency translation of \$7.6 million and unfavorable product mix of \$0.6 million.

The lower manufacturing costs were primarily driven by lower raw material pass-through costs, including sulfur, caustic and natural gas and by-product mix. The higher volume was primarily driven by strong demand across multiple product lines, including our silica catalyst product group serving the packaging and engineered plastics industries and our refining services product group, partially offset by lower volumes of higher margin potassium silicate and spray dry silicate (due to lower oil drilling activity) along with lower zeolite and beer gel volumes in the Americas. Our unfavorable variance in pricing relates to pass-through pricing of natural gas and sulfur.

Selling, General and Administrative Expenses

Historical: Selling, general and administrative expenses for the year ended December 31, 2016 were \$107.6 million, an increase of \$73.0 million compared with \$34.6 million for the year ended December 31, 2015. The increase in Selling, general and administrative was due to \$76.2 million attributable to the inclusion of legacy PQ in our results of operations for the period from May 4, 2016 to December 31, 2016, partly offset by \$3.2 million of lower Selling, general and administrative expenses from the benefit of cost reduction initiatives.

Pro Forma: Selling, general and administrative expenses for the year ended December 31, 2016 were \$145.0 million as compared with \$140.9 million for the year ended December 31, 2015.

Other Operating Expense, Net

Historical: Other operating expense, net for the year ended December 31, 2016 was \$62.3 million, an increase of \$42.6 million, or 216.2%, compared with \$19.7 million for the year ended December 31, 2015. The increase in other operating expense, net was due to \$48.4 million attributable to the inclusion of legacy PQ in our results of operations for the period from May 4, 2016 to December 31, 2016, partly offset by \$5.6 million of lower restructuring and severance related costs.

Pro Forma: Other operating expense, net for the year ended December 31, 2016 was \$75.0 million, an increase of \$7.3 million, or 10.8%, compared with \$67.7 million for the year ended December 31, 2015. The change was primarily driven by \$6.4 million of intangible asset impairment charges, \$6.1 million of higher restructuring and severance related charges and \$4.0 million from the absence of prior year nitrogen oxide credit sales. These changes were partly offset by lower transaction and other related costs of \$10.2 million. During the year ended December 31, 2015, we incurred separation charges related to an executive who left our company.

Equity in Net (Loss) Income of Affiliated Companies

Historical: Equity in net loss of affiliated companies for the year ended December 31, 2016 was \$2.6 million. The loss was due to the impact of \$36.3 million of amortization on the fair value step-up of the

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underlying assets of our Zeolyst Joint Venture in connection with the Business Combination, partly offset by \$33.2 million of earnings generated mainly by our Zeolyst Joint Venture from the Business Combination during the period from May 4, 2016 through December 31, 2016.

Pro Forma: Equity in net income of affiliated companies for the year ended December 31, 2016 was \$35.2 million, a decrease of \$5.9 million, compared with \$41.1 million for the year ended December 31, 2015. The decrease was primarily driven by lower contribution from reduced sales of hydrocracking and specialty catalysts and other various cost increases, partially offset by increased volume in pressure products (primarily due to emission regulations). Cost drivers include higher fixed costs and depreciation from expansion and inflation, and growth-related increases in selling, general and administrative and research and development expense, partly offset by favorable inventory absorption. Hydrocracking demand was down primarily due to the timing of re-fills as the products used in hydrocracking typically have a two-to-four year life cycle before they must be replaced.

Interest Expense, Net

Historical: Interest expense, net for the year ended December 31, 2016 was \$140.3 million, an increase of \$96.0 million, or 216.7%, as compared with \$44.3 million for the year ended December 31, 2015. Interest expense increased primarily due to higher third-party interest expense under our new debt structure compared to the legacy Eco debt structure on a standalone basis.

Pro Forma: Interest expense, net for the year ended December 31, 2016 was \$187.9 million, a decrease of \$11.7 million, or 5.9%, compared with \$199.6 million for the year ended December 31, 2015. Interest expense decreased primarily due to the repricing of our new debt structure during the year ended December 31, 2016.

Debt Extinguishment Costs

Historical: On May 4, 2016, and concurrently with the consummation of the Business Combination, the company refinanced its existing credit facilities. The company recorded \$4.7 million of new creditor and third-party financing costs 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.

On November 14, 2016, the company repriced its existing senior secured term loan facility. The company recorded \$0.5 million of new creditor and third-party financing costs fees as debt extinguishment costs. In addition, previously unamortized deferred financing costs of \$0.6 million and original issue discount of \$0.8 million associated with the previously outstanding debt were written off as debt extinguishment costs.

Pro Forma: On November 14, 2016, the company repriced its existing senior secured term loan facility. The company recorded \$0.5 million of new creditor and third-party financing costs fees as debt extinguishment costs. In addition, previously unamortized deferred financing costs of \$0.6 million and original issue discount of \$0.7 million associated with the old debt were written off as debt extinguishment costs.

Other (Income) Expense

Historical: Other income, net was \$3.4 million for the year ended December 31, 2016. Other income, net primarily consisted of \$3.6 million of foreign currency gains for the year ended December 31, 2016. The change in foreign currency for the year ended December 31, 2016 was driven by a weakening U.S. dollar (as compared to the prior year) on intercompany debt denominated in foreign currencies translated to U.S. dollars.

Pro Forma: Other income, net was \$8.8 million for the year ended December 31, 2016, a favorable change of \$30.1 million, compared with \$21.3 million of other expense, net for the year ended December 31, 2015. Other income, net primarily consisted of \$8.8 million of foreign currency gain for the year ended December 31,

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2016 as compared to a \$21.1 million loss for the year ended December 31, 2015. The change in foreign currency for the year ended December 31, 2016 was driven by a weakening U.S. dollar (as compared to the prior year) on intercompany debt denominated in foreign currencies translated to U.S. dollars.

Provision for Income Taxes

Historical: The provision for income taxes for the year ended December 31, 2016 was \$10.0 million. The effective income tax rate for the year ended December 31, 2016 was (14.5%). As a result of the Business Combination, Eco had a change in tax status. Eco was previously a partnership for tax purposes and, following the Business Combination, is taxed as a C-corporation. As a result of being a partnership, Eco had not previously recorded deferred taxes as its members were responsible for their respective tax liabilities. Upon the change in tax status, Eco's net deferred tax liability was recorded as a charge to the tax provision.

Pro Forma: The provision for income taxes for the year ended December 31, 2016 was \$58.0 million compared with a \$1.2 million provision for the year ended December 31, 2015. The effective income tax rate for the year ended December 31, 2016 was 22,295.0% compared to 4.8% for the year ended December 31, 2015. As a result of the Business Combination, Eco had a change in tax status. Eco was previously a partnership for tax purposes and, following the Business Combination, is taxed as a C-corporation. As a result of being a partnership, Eco had not previously recorded deferred taxes as its members were responsible for their respective tax liabilities. Upon the change in tax status, Eco's net deferred tax liability was recorded as a charge to the tax provision. The company's effective income tax rate fluctuates based on, among other factors, changes in income mix. The difference between the U.S. federal statutory income tax rate and the company's effective income tax rate for the years ended December 31, 2016 and 2015 was mainly due to the tax effect of repatriating foreign earnings back to the United States as dividends, differences between tax rates in foreign jurisdictions as compared to the U.S. tax rate, withholding taxes, and changes to reserves for uncertain tax positions.

Net (Loss) Income 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 \$79.7 million for the year ended December 31, 2016 compared with net income of \$11.5 million for year ended December 31, 2015.

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 was \$59.0 million for the year ended December 31, 2016 compared to a net loss of \$26.9 million for the year ended December 31, 2015.

Pro Forma Segment Adjusted Earnings Before Interest, Taxes, Depreciation and Amortization (Adjusted EBITDA)

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

	Pro Forma		Change	
	Year ended December 31,		\$	%
	2016	2015		
	(in millions, except percentages)			
Segment Adjusted EBITDA ⁽¹⁾ :				
Performance Materials & Chemicals	\$ 231.8	\$ 241.7	\$ (9.9)	(4.1)%
Environmental Catalysts & Services ⁽²⁾	221.8	190.8	31.0	16.3%
Total Segment Adjusted EBITDA ⁽³⁾	453.6	432.5	21.1	4.9%
Corporate ⁽⁴⁾	(32.8)	(19.4)	(13.4)	69.1%
Total Adjusted EBITDA ⁽³⁾	\$ 420.8	\$ 413.1	\$ 7.7	1.9%

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- (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 on several factors, of which the primary measure is 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 equity in net income included in the environmental catalysts and services segment for the Zeolyst Joint Venture was \$41.6 million and \$46.7 million for the years ended December 31, 2016 and 2015, respectively.
- (3) Our Total Segment Adjusted EBITDA differs from our total consolidated Adjusted EBITDA due to unallocated corporate expenses.
- (4) Included in Corporate in the year ended December 31, 2016 are \$5.5 million of corporate costs related to the environmental catalysts and services segment.

Adjusted EBITDA for the year ended December 31, 2016 was \$420.8 million, an increase of \$7.7 million, or 1.9%, compared with \$413.1 million for the year ended December 31, 2015.

Performance Materials & Chemicals: Adjusted EBITDA for the year ended December 31, 2016 was \$231.8 million, a decrease of \$9.9 million, or 4.1%, compared with \$241.7 million for the year ended December 31, 2015.

The decrease in Adjusted EBITDA was primarily due to the unfavorable effect of foreign currency translation of \$6.3 million, prior year nitrogen oxide credit sales of \$4.0 million that were not in the current year, and lower volumes of higher margin potassium silicate and spray dry silicate (due to lower oil drilling activity) along with lower zeolite and beer gel volumes in the Americas. This was partially offset by higher selling prices and mix improvements primarily from increased sales of higher margin specialty silicas, magnesium silicate, and spray dry silicates (in Europe), reduced sales of lower margin sodium silicates and improved mix in transportation safety.

Environmental Catalysts & Services: Adjusted EBITDA for the year ended December 31, 2016 was \$221.8 million, an increase of \$31.0 million, or 16.3%, compared with \$190.8 million for the year ended December 31, 2015.

The increase in Adjusted EBITDA was due to higher volume primarily driven by strong demand across multiple product lines, including our silica catalyst product group serving the packaging and engineered plastics industries and our refining services product group and lower fixed plant cost reductions and plant turnaround expense. This was partially offset by the unfavorable effect of foreign currency translation of \$1.0 million and unfavorable product mix.

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A reconciliation of Segment Adjusted EBITDA to our pro-forma net income (loss) is as follows:

	Pro Forma	
	Year ended December 31,	
	2016	2015
	(in millions, except percentages)	
Reconciliation of pro forma net loss attributable to PQ Group Holdings Inc. to Segment Adjusted EBITDA		
Net loss attributable to PQ Group Holdings Inc.	\$ (59.0)	\$ (26.9)
Provision for income taxes	58.0	1.2
Interest expense, net	187.9	199.6
Depreciation and amortization	165.8	152.2
EBITDA	352.7	326.1
Joint venture depreciation, amortization and interest ^(a)	10.3	7.9
Amortization of investment in affiliate step-up ^(b)	5.8	6.6
Amortization of inventory step-up ^(c)	4.9	—
Impairment of long-lived and intangible assets	6.9	0.4
Debt extinguishment costs	1.8	—
Net loss on asset disposals ^(d)	4.8	5.5
Foreign currency exchange loss (gain) ^(e)	(9.0)	21.1
Non-cash revaluation of inventory, including LIFO	1.3	(2.1)
Management advisory fees ^(f)	5.3	5.6
Transaction and other related costs ^(g)	2.6	13.2
Equity-based and other non-cash compensation	6.5	4.2
Restructuring, integration and business optimization expenses ^(h)	17.9	8.6
Defined benefit plan pension cost ⁽ⁱ⁾	2.8	6.1
Transition services ^(j)	—	4.9
Other ^(k)	6.0	5.1
Adjusted EBITDA	420.8	413.1
Unallocated corporate expenses	32.8	19.4
Total Segment Adjusted EBITDA	<u>\$ 453.6</u>	<u>\$ 432.5</u>

- (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 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 will cease as of the effective date of our initial public offering.

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- (g) Relates to certain transaction costs described elsewhere in our consolidated financial statements included in this prospectus 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) Represents costs under a transition services agreement with Solvay that provided certain transition services to legacy Eco by Solvay following the 2014 Acquisition. The transition services agreement ended in 2015.
- (k) 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.

Year Ended December 31, 2015 Compared to the Period from Inception (July 30, 2014) to December 31, 2014 (Successor Period) and the Period from January 1, 2014 to November 30, 2014 (Predecessor Period)

The following is our consolidated statement of operations and a summary financial performance for the year ended December 31, 2015, the period from inception (July 30, 2014) to December 31, 2014 (“Successor” period) and the period from January 1, 2014 to November 30, 2014 (“Predecessor” period) and should be read in conjunction with our historical audited financial statements and notes thereto included elsewhere in this prospectus. These results of operations include legacy Eco for all periods presented and may not be comparable to our financial statements for periods following the Business Combination.

Highlights

The following is a summary of our financial performance for the year ended December 31, 2015 compared with the Successor period and Predecessor period.

	Historical		
	Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014	
Year ended December 31, 2015	December 31, 2014	November 30, 2014	
(in millions, except percentages)			
Sales	\$ 388.9	\$ 35.5	\$ 361.8
Cost of goods sold	278.8	30.2	265.8
Gross profit	110.1	5.3	96.0
<i>Gross profit margin</i>	28.3%	14.9%	26.5%
Selling, general and administrative expenses	34.6	2.6	45.2
Other operating expense, net	19.7	16.3	5.6
Operating income (loss)	55.8	(13.6)	45.2
<i>Operating income margin</i>	14.3%	(38.3)%	12.5%
Interest expense, net	44.3	8.5	0.1
Income (loss) before income taxes	11.5	(22.1)	45.1
Provision for income taxes	—	—	14.6
<i>Effective tax rate</i>	0.0%	0.0%	32.3%
Net income (loss)	\$ 11.5	\$ (22.1)	\$ 30.5

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Sales

	Historical	
	Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
Year ended December 31, 2015	December 31, 2014	
(in millions, except percentages)		
Net Sales:		
Performance Materials & Chemicals	\$ —	\$ —
Environmental Catalysts & Services	388.9	35.5
Inter-segment sales eliminations	—	—
Total net sales	<u>\$ 388.9</u>	<u>\$ 35.5</u>
		<u>\$ 361.8</u>

Sales for the year ended December 31, 2015, the Successor period and the Predecessor period was \$388.9 million, \$35.5 million and \$361.8 million, respectively. Virgin sulfuric acid sales decreased due to lower pricing related to raw material (sulfur) costs passed through to customers and reduced volumes to a large customer. This was partially offset by an increase in regeneration volumes.

Gross Profit

Gross profit for the year ended December 31, 2015, the Successor period and Predecessor period was \$110.1 million, \$5.3 million and \$96.0 million, respectively. The increase in gross profit was primarily due to lower sulfur and natural gas prices, fixed plant costs and lower freight transportation costs.

Selling, General and Administrative Expenses

Selling, general and administrative expenses for the year ended December 31, 2015, the Successor period and Predecessor period was \$34.6 million, \$2.6 million and \$45.2 million, respectively. The decrease was primarily due to a lower depreciation expense in selling, general and administrative expense. Partially offsetting this decrease was an increase in certain selling, general and administrative expenses, due to post-acquisition transition costs associated with the 2014 Acquisition, including the costs of the Solvay transition services agreement, stock-based compensation expense, higher salaries, fringe benefits and severance expense, plus increased professional fees for accounting, legal and other advisory services.

Other Operating Expense, Net

Other operating expense, net for the year ended December 31, 2015, the Successor period and Predecessor period was \$19.7 million, \$16.3 million and \$5.6 million, respectively. The decrease in operating expense, net was primarily due to one-time transaction fees incurred in the Successor and Predecessor periods related to the 2014 Acquisition.

Interest Expense, Net

Interest expense, net for the year ended December 31, 2015, the Successor period and Predecessor period was \$44.3 million, \$8.5 million and \$0.1 million, respectively. The increase in interest expense was due to a full year of interest expense in 2015 for the \$700.0 million of new debt obligations related to the Eco's senior secured credit facilities and Eco's 8.5% senior unsecured notes due 2022 issued on December 1, 2014.

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Provision for Income Taxes

Eco was a single member limited liability company, treated as a partnership for federal and state income tax purposes. All income tax liabilities and/or benefits of Eco were passed through to the member. As such, no recognition of federal or state income taxes for Eco was provided for in the Successor period financial statements.

For the Predecessor period financial statements, income taxes have been prepared on a separate return basis as if Solvay's Eco Services business unit was a stand-alone entity. Historically, Solvay's Eco Services business unit was included in the tax filings with other Solvay entities. Solvay's Eco Services business unit's tax results as presented are not reflective of the results that Eco generated following the 2014 Acquisition or would have generated on a stand-alone basis.

Net Income (Loss)

For the foregoing reasons, net income (loss) for the year ended December 31, 2015, the Successor period and the Predecessor period was \$11.5 million, \$(22.1) million and \$30.5 million, respectively.

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. 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 capital, which includes spending on maintenance of business and health, safety and environmental initiatives, and expansion capital, which includes spending to drive organic sales growth and cost savings initiatives. For the six months ended June 30, 2017, we spent approximately \$36.7 million in maintenance capital expenditures and \$17.5 million in expansion capital expenditures. For the year ended December 31, 2016, we spent approximately \$98.7 million in maintenance capital expenditures and \$31.6 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 June 30, 2017, we had cash and cash equivalents of \$50.5 million and availability of \$105.2 million under our asset based lending revolving credit facility, after giving effect to \$19.6 million of outstanding letters of credit and \$65.0 million of revolving credit facility borrowings, for a total available liquidity of \$155.6 million. As of June 30, 2017, we were in compliance with all covenants under our debt agreements.

Included in our cash and cash equivalents balance as of June 30, 2017 was \$43.5 million of cash and cash equivalents held in foreign jurisdictions. We repatriate cash held outside of the United States from certain foreign subsidiaries in order to meet domestic liquidity needs. In certain cases, the repatriation of foreign cash under current U.S. tax laws is subject to income taxes. We have an intercompany loan structure in place with several of our foreign subsidiaries that allows us, under current U.S. tax laws, to repatriate foreign cash in a tax efficient manner from those subsidiaries. Depending on domestic and foreign cash needs, we have the flexibility to repatriate foreign cash to meet our future liquidity needs, subject to satisfaction of any applicable U.S. income taxes.

As of June 30, 2017, our total indebtedness was \$2,728.4 million, with up to \$105.2 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 six months ended

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June 30, 2017 and 2016 was approximately \$91.7 million and \$35.1 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 \$18.3 million on interest expense. Our ability to make payments on and to refinance our indebtedness will depend on our ability to generate cash in the future.

Cash Flow

	Six months ended June 30,		Year ended December 31,		Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
	2017	2016	2016	2015		
(in millions)						
Net cash provided by (used in)						
Operating activities	\$ 21.8	\$ (4.4)	\$ 119.7	\$ 44.7	\$ (2.1)	\$ 57.6
Investing activities	(103.5)	(1,831.5)	(1,929.7)	(38.7)	(888.3)	(32.9)
Financing activities	66.8	1,859.5	1,861.4	(3.4)	913.0	(24.7)
Effect of exchange rate changes on cash and cash equivalents	(5.3)	(1.3)	(5.9)	—	—	—
Net change in cash and cash equivalents	(20.2)	22.3	45.5	2.6	22.6	—
Cash and cash equivalents at beginning of period	70.7	25.2	25.2	22.6	—	—
Cash and cash equivalents at end of period	<u>\$ 50.5</u>	<u>\$ 47.5</u>	<u>\$ 70.7</u>	<u>\$ 25.2</u>	<u>\$ 22.6</u>	<u>\$ —</u>

	Six months ended June 30,		Year ended December 31,		Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
	2017	2016	2016	2015		
(in millions)						
Working capital changes that provided (used) cash:						
Receivables	\$ (44.0)	\$ (8.0)	\$ 27.8	\$ (0.3)	\$ (7.9)	\$ (4.1)
Inventories	2.0	2.8	(2.3)	(1.7)	4.9	(5.2)
Prepays and other current assets	(1.4)	0.6	0.5	20.1	(2.2)	—
Accounts payable	(7.4)	(7.9)	11.9	(2.5)	(1.6)	6.8
Accrued liabilities	(25.8)	(17.2)	(24.8)	(13.8)	23.3	2.6
Other, net	(1.4)	(2.4)	(6.8)	(4.8)	0.2	(5.8)
	<u>\$ (78.0)</u>	<u>\$ (32.1)</u>	<u>\$ 6.3</u>	<u>\$ (3.0)</u>	<u>\$ 16.7</u>	<u>\$ (5.7)</u>

Six Months Ended June 30, 2017 Compared to the Six Months Ended June 30, 2016

Net cash provided by operating activities was \$21.8 million for the six months ended June 30, 2017 compared to \$4.4 million of cash used in the six months ended June 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 six months ended June 30, 2017 by \$72.0 million compared to the same period in the prior year. Cash used in working capital during the six months ended June 30, 2017 was unfavorable compared to the six months ended June 30, 2016. Working capital for the six months ended June 30, 2017 used cash of \$78.0 million compared to cash used of \$32.1 million for the six months ended June 30, 2016.

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The increase in non-cash items of \$72.0 million as compared to the prior year period was due to a decrease in our net loss of \$76.1 million, an increase of \$41.2 million of depreciation and amortization expense, \$14.9 million of dividends received from affiliated companies, \$13.3 million of foreign currency losses, and \$2.0 million of amortization of deferred financing costs and original issue discount, which was partially offset by \$31.3 million of deferred tax benefits, \$19.3 million of net income from affiliated companies, \$16.8 million of lower acquisition accounting valuation adjustments on inventory sold, \$7.2 million of lower debt extinguishment costs, and \$2.8 million of pension and postretirement plan net funding.

The decrease in cash from working capital of \$45.9 million compared to the prior year was primarily due to unfavorable changes in accounts receivable, accrued liabilities, prepaid and other current assets and inventories. The unfavorable change was partially offset by favorable changes in accounts payable and other liabilities.

The unfavorable change in accounts receivable was due primarily to higher accounts receivables from higher current year pricing and volumes. The favorable change in accounts payable is due to timing of payments for capital expenditures. The unfavorable change in accrued liabilities is primarily due to the timing of accrued interest under our new debt structure and various other accruals.

Net cash used in investing activities was \$103.5 million for the six months ended June 30, 2017 compared to cash used of \$1,831.5 million during the same period in 2016. Current year uses of cash include utilizing \$60.6 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 \$38.5 million to fund capital expenditures.

Net cash provided by financing activities was \$66.8 million for the six months ended June 30, 2017 compared to \$1,859.5 million during the same period in 2016. The change in cash from financing activities was primarily driven by the issuance of \$2,291.4 million in debt, net of financing fees, related to the Business Combination in the prior year, partially offset by \$466.8 million in lower debt repayments and \$37.0 million in net revolver borrowings in the current year.

Year Ended December 31, 2016 Compared to the Year Ended December 31, 2015

Net cash provided by operating activities was \$119.7 million for the year ended December 31, 2016, compared to \$44.7 million provided during the same period in the year ended December 31, 2015. Cash generated by operating earnings after giving effect to non-cash items recognized in the income statement during the period was higher during the year ended December 31, 2016 by \$65.8 million compared to the same period in the prior year. Cash provided by working capital during the year ended December 31, 2016 was favorable compared to the year ended December 31, 2015. Working capital for the year ended December 31, 2016 provided cash of \$6.3 million, compared to cash used of \$3.0 million for the year ended December 31, 2015.

The increase in non-cash items of \$65.8 million as compared to the prior year was due to an increase of \$89.3 million of depreciation and amortization expense, \$29.1 million of acquisition accounting valuation adjustments on inventory sold, \$8.6 million of debt extinguishment costs, \$11.1 million of pension and postretirement plan net funding and \$7.6 million of dividends received from affiliates, which was partially offset by \$90.6 million of lower net income.

The increase in cash from working capital of \$9.3 million compared to the prior year was primarily due to favorable changes in accounts receivable and accounts payable, partially offset by unfavorable changes in prepaid and other current assets, accrued liabilities and other long-term assets and liabilities.

The favorable change in accounts receivable was due primarily to \$1.2 million of lower accounts receivable from lower current year pricing and higher collections and \$26.9 million due to the impact from the Business Combination. The favorable change in accounts payable includes \$12.5 million favorability from timing of current year plant turnaround capital expenditures and higher raw material and transportation purchases.

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The unfavorable change in prepaid expenses and other current assets was due to decreases in other receivable balances, mainly the prior year legacy Eco collection of \$23.3 million from Solvay related to the 2014 Acquisition. The unfavorable change in accrued liabilities was mainly due to the timing of various accruals.

Net cash used in investing activities was \$1,929.7 million for the year ended December 31, 2016, compared to cash used of \$38.7 million during the same period in 2015. The increase in current year cash used in investing activities compared to the prior year was primarily due to the Business Combination activity, net of cash acquired in the Business Combination of \$1,777.7 million, increases in capital spending of \$80.4 million and increases in loans receivable of \$15.6 million and related increases in restricted cash of \$14.8 million under the NMTC financing. The capital expenditures increase was primarily due to \$75.4 million related to the companies acquired as part of the Business Combination and \$5.0 million in capital spending. Higher current year strategic project costs were partly offset by lower plant turnaround expenses.

Net cash provided by financing activities was \$1,861.4 million for the year ended December 31, 2016, compared to net cash used of \$3.4 million during the same period in 2015. The change in cash from financing activities was primarily driven by \$1,865.0 million debt issuance activity from the Business Combination, net of repayments, \$22.0 million net revolver payments in 2016, recent stock purchase activity of \$2.5 million and payments of \$1.6 million related to hedge premiums. This was partially offset by \$22.0 million of cash received under the issuance of long-term debt under the NMTC financing and \$5.1 million of current year equity contributions, most of which resulted from the Business Combination.

Year Ended December 31, 2015 Compared to the Period from Inception (July 30, 2014) to December 31, 2014 (Successor Period) and the Period from January 1, 2014 to November 30, 2014 (Predecessor Period)

Cash Flows from Operating Activities—Successor Period

Net cash provided by operating activities was \$44.7 million for the year ended December 31, 2015. The net cash provided by operating activities was the result of net income of \$11.4 million, adjusted for noncash items of \$36.2 million for depreciation, amortization, amortization of debt issuance costs, accretion of debt discount, pension expense, loss on disposal of fixed assets and stock-based compensation expense. Routine operating activities produced cash of \$20.1 million through net changes in prepaid expenses and other current assets. These activities were offset by certain routine operating activities, which used cash of \$23.1 million represented by net changes in accounts receivable, inventories, accounts payable, accrued expenses and other assets and liabilities.

Net cash used in operating activities for the period from inception (July 30, 2014) to December 31, 2014 (Successor period) was the result of a net loss of \$22.1 million, adjusted for noncash items of \$3.2 million for depreciation, amortization, including amortization of debt issuance costs, accretion of debt discount and \$16.8 million of cash provided for routine operating activities represented by net changes in accounts receivable, other receivables, inventories, prepaid expenses, accounts payable, other payables, other current liabilities, accrued expenses and other long-term liabilities. For the Successor period, routine operating activities produced cash through a decrease in inventory of \$4.9 million and an increase in accrued liabilities of \$23.3 million. This was partially offset by an increase in accounts receivable of \$7.9 million, an increase in prepaid and other current assets of \$2.2 million and a decrease in accounts payable of \$1.6 million.

Cash Flows from Operating Activities—Predecessor Period

Net cash provided by operating activities for the period from January 1, 2014 to November 30, 2014 (Predecessor period) was the result of net income of \$30.5 million, adjusted for noncash items of \$32.7 million for depreciation, amortization, stock-based compensation and deferred income tax expense, and \$5.7 million of cash used for routine operating activities, represented by changes in accounts receivable, other receivables, inventories, prepaid expenses, accounts payable, accrued expenses, other long-term liabilities and long-term deferred revenue. For the Predecessor period, routine operating activities used cash through an increase in

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accounts receivable of \$4.1 million, an increase in inventories of \$5.2 million and a decrease in other assets and liabilities of \$5.8 million. This was partially offset by an increase in accounts payable of \$6.8 million and an increase in accrued liabilities of \$2.6 million.

Cash Flows from Investing Activities—Successor Period

Net cash used for investing activities was \$38.7 million for the year ended December 31, 2015 due to purchases of property, plant, and equipment and intangible assets.

Net cash used for investing activities for the Successor period was \$888.3 million, primarily as the result of cash paid for the 2014 Acquisition of \$885.4 million and \$2.9 million for capital expenditures.

Cash Flows from Investing Activities—Predecessor Period

Net cash used for investing activities for the Predecessor period was \$32.9 million resulting primarily from capital expenditures.

Cash Flows from Financing Activities—Successor Period

Net cash used in financing activities was \$3.4 million for the year ended December 31, 2015, primarily due to \$5.0 million repayment of term loan borrowings, partially offset by proceeds from issuance of member's equity of \$1.5 million. Eco borrowed and repaid \$12 million from its revolving credit facility during the year ended December 31, 2015.

Net cash provided by financing activities for the Successor period was \$913.0 million. Cash provided from financing activities was the result of funding the 2014 Acquisition, including \$239.9 million from the issuance of members' equity, \$497.5 million proceeds from issuance senior secured credit facilities borrowings, net of discount, and \$200.0 million proceeds from the issuance of senior unsecured notes, partially offset by debt issuance costs of \$24.4 million.

Cash Flows from Financing Activities—Predecessor Period

Net cash used for financing activities was \$24.9 million for the Predecessor period, which included \$24.7 million in net transfers to Solvay.

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Debt

	As of	As of December 31,	
	June 30, 2017	2016	2015
	(in millions)		
Term Loan Facility (U.S. dollar denominated)	\$ 920.8	\$ 925.4	\$ —
Term Loan Facility (Euro denominated)	321.7	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	200.0
Eco Senior secured credit facilities	—	—	495.0
ABL Facility	65.0	—	—
Other	70.9	45.2	—
Total debt	2,728.4	2,617.9	695.0
Original issue discount	(26.4)	(28.4)	(2.2)
Deferred financing costs	(26.0)	(27.3)	(19.7)
Total debt, net of original issue discount and deferred financing costs	\$ 2,676.0	\$ 2,562.2	\$ 673.1
Less: current portion	(86.3)	(14.5)	(5.0)
Total long term debt, net of original issue discount and deferred financing costs	\$ 2,589.7	\$ 2,547.7	\$ 668.1

As of June 30, 2017 our total debt was \$2,728.4 million, including \$2.3 million of other foreign debt and \$51.8 million of notes payable for the NMTC financing and excluding the original issue discount of \$26.4 million and deferred financing fees of \$26.0 million for our senior secured credit facilities and notes. Our net debt was \$2,623.8 million, excluding \$2.3 million of other foreign debt, \$51.8 million of NMTC, and including cash of \$50.5 million. Our total available liquidity as of June 30, 2017 was \$155.6 million, which represents our cash on hand of \$50.5 million plus our excess availability under our asset based lending revolving credit facility of \$105.2 million, after giving effect to \$19.6 million of outstanding letters of credit and \$65.0 million of ABL revolver borrowings. For a further description of our outstanding indebtedness, see "Description of Certain Indebtedness."

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.

	Six months ended		Year ended		Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
	June 30, 2017	June 30, 2016	December 31, 2016	December 31, 2015		
	(in millions)					
Maintenance capital expenditures	\$ 36.7	\$ 25.8	\$ 98.7	\$41.0	\$ 2.9	\$ 32.7
Expansion capital expenditures	17.5	12.7	31.6	0.9	—	—
Total capital expenditures	\$ 54.2	\$ 38.5	\$130.3	\$41.9	\$ 2.9	\$ 32.7

Capital expenditures remained at a level sufficient for required maintenance and certain expansion growth initiatives during these periods. Maintenance capital expenditures are higher in the year ended December 31,

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2016 due mainly to the Business Combination, partly offset by lower current year refining services plant turnaround maintenance costs. Expansion capital expenditures are higher in the year ended December 31, 2016 due to timing of our expansion projects related to our strategic growth and cost reduction initiatives, each from the Business Combination and in our refining services product group.

Pension Funding

We paid \$3.6 million and \$0.3 million in cash contributions into our defined benefit pension plans and other post-retirement plans during the six months ended June 30, 2017 and 2016, respectively. The periodic pension expense was \$2.1 million and \$1.6 million for those same periods, respectively.

We paid \$2.9 million and \$14.9 million in cash contributions into our defined benefit pension plans and other post-retirement plans during the years ended December 31, 2016 and 2015, respectively. Included in the 2015 cash contributions, legacy Eco paid \$4.3 million in start-up contributions for the new defined benefit plan associated with the spin-off from Solvay in December 2014. The periodic pension expense was \$2.0 million and \$2.9 million for those same periods, respectively.

As of December 31, 2016, our pension plans and other post-retirement benefit plans were underfunded by \$68.4 million and \$4.6 million, respectively. In addition, our supplemental retirement plan had a liability of \$13.2 million, which is funded by our general assets, including assets held in a Rabbi trust of \$5.6 million, or restoration plan assets.

Off-Balance Sheet Arrangements

We had \$19.6 million and \$18.4 million of outstanding letters of credit on our revolver facility as of June 30, 2017 and December 31, 2016, respectively.

Contractual Obligations and Commitments

The following table reflects our contractual obligations, commercial commitments and long-term debt obligations as of December 31, 2016. As of June 30, 2017, there had been no material changes to such contractual obligations, commercial commitments and long-term debt.

	Payments due by period				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 yrs
Long-term debt(a)	\$ 2,617.9	\$ 14.5	\$ 24.6	\$ 45.6	\$ 2,533.2
Interest payments(b)	1,022.7	187.4	372.8	370.4	92.1
Operating leases	55.6	16.5	17.3	10.2	11.6
Purchase obligations(c)	34.3	17.2	12.1	1.6	3.4
Other obligations(d)	21.4	9.5	3.3	2.9	5.7
Total contractual obligations	<u>\$ 3,751.9</u>	<u>\$ 245.1</u>	<u>\$ 430.1</u>	<u>\$ 430.7</u>	<u>\$ 2,646.0</u>

- (a) No prepayment or redemption of any of our long-term debt balances has been assumed. Refer to “Financial Condition, Liquidity and Capital Resources” section of this Management’s Discussion and Analysis and Note 15, Long-term Debt, in the Notes to the Audited Consolidated Financial Statements of PQ Group Holdings Inc. and Subsidiaries included elsewhere in this prospectus for information regarding the terms of our long-term debt agreements. For a further description of our outstanding indebtedness, see “Description of Certain Indebtedness.”
- (b) Interest on long-term debt excludes the amortization of deferred financing fees and original issue discount. The amounts represent minimum interest payments. All future interest payments on Euro-denominated loans were calculated using a December 31, 2016 Euro to U.S. Dollar spot exchange rate.

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- (c) Purchase obligations include agreements to purchase goods and services that are enforceable and legally binding and that specify all significant terms, including fixed and minimum quantities to be purchased, fixed, minimum or variable provisions, and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable without penalty.
- (d) Other obligations represent payments related to our pension plans, supplemental retirement plans and other post-retirement benefit plans. Included in these amounts are expected pension plan contributions of \$7.7 million in 2017. Contributions to the pension plan beyond 2016 cannot be reasonably estimated and are not reflected in this table.

We expect that we will be able to fund our remaining obligations and commitments with cash flow from operations. To the extent we are unable to fund these obligations and commitments with cash flow from operations, we intend to fund these obligations and commitments with proceeds from available borrowing capacity under our ABL Facility or under future financings.

Critical Accounting Policies

We prepare our consolidated financial statements in conformity with GAAP and our significant accounting policies are described in Note 2 to our consolidated financial statements. 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 have identified below the accounting policies and estimates that we believe are most critical in compiling our consolidated statements of financial condition and operating results.

Business Combinations

We record acquisitions using the acquisition method of accounting and accordingly, the results of operations of the businesses we acquire are included in our consolidated financial statements from the date control is obtained of each respective acquisition. The acquisition purchase price for each business is allocated based on the fair values of the assets acquired, liabilities assumed and any noncontrolling interest in the acquired entity. Acquisition-related costs attributable to a business combination are expensed as incurred and are not included in the cost allocated to the acquired assets and assumed liabilities. Goodwill is an asset representing the future economic benefits arising from other assets acquired in a business combination that are not individually identified and separately recognized. Goodwill as of the acquisition date is measured as the excess of the fair value of consideration transferred over the fair values of the net assets acquired.

The valuation of the net assets acquired in a business combination is subject to estimation, in particular around intangible assets other than goodwill and property, plant and equipment. To assist in the valuation of these assets, we typically utilize a third-party valuation specialist. Significant intangible assets other than goodwill acquired include customer relationships, technical know-how, trade names and trademarks. We generally value acquired intangibles other than goodwill using an income approach, namely the relief-from-royalty method for trade names, trademarks and technical know-how, and the multi-period excess earnings method for customer relationships. Key assumptions underlying the respective income approach methodologies include projected sales, estimated economic lives of the assets, discount and royalty rates, and contributory asset charges. We value acquired property, plant and equipment using either the market or cost approaches depending on the type of fixed asset.

While we use our best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date, our estimates are inherently uncertain and subject to refinement to reflect information about the facts and circumstances existing as of the acquisition date that, if known, would have affected the

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measurement of the amounts recognized as of the acquisition date. As a result, during the measurement period, which may be up to one year from the acquisition date, we may record adjustments to the provisional amounts recorded for the net assets acquired, with the corresponding offset to goodwill. Under new guidance adopted on a prospective basis beginning on December 31, 2015, adjustments to the provisional amounts are reflected in the consolidated financial statements for the reporting period in which the adjustments are determined, including by recognizing in current period earnings the full effect of changes in depreciation, amortization or other income effects. Upon the final determination of the fair values of the net assets acquired, any subsequent adjustments are recorded in our consolidated statements of operations.

Revenue Recognition and Accounts Receivable

Revenue, net of related discounts and allowances, is recognized when both title and risk of loss of the product have been transferred to the customer (generally upon shipment), the seller's price to the buyer is fixed or determinable, collectability is reasonably assured and persuasive evidence of an arrangement exists. Customers take title and assume all the risks of ownership based on delivery terms, which are generally included in customer contracts of sale, order confirmation documents and invoices.

We recognize rebates given to customers as a reduction of revenues based on an allocation of the cost of honoring rebates earned and claimed to each of the underlying revenue transactions that result in progress by the customer toward earning the rebate. Rebates are recognized at the time revenue is recorded. We measure the rebate obligation based on the estimated amount of sales that will result in a rebate at the adjusted sales price per the respective sales agreement.

Amounts billed to a customer in a sale transaction related to shipping and handling, if any, represent revenues earned for the goods provided and are classified as revenue. Costs related to shipping and handling of products shipped to customers are classified as cost of goods sold.

We make certain assumptions and estimates when accruing for allowances for doubtful accounts. Trade accounts receivable are recorded at the invoiced amount and do not bear interest. The allowance for doubtful accounts is our best estimate of the amount of probable credit losses in our existing accounts receivable. A specific reserve for bad debt is recorded for known or suspected doubtful accounts receivable. For all other accounts, we recognize a reserve for bad debt based on the length of time receivables are past due and historical write-off experience. Account balances are charged against the allowance when we believe it is probable that the associated receivables will not be recovered. If the financial condition of our customers was to deteriorate resulting in an impairment of their ability to make payments, additional allowances may be required. We do not have any off-balance sheet credit exposure related to our customers.

Our estimates and assumptions made under the revenue recognition policy have been applied on a consistent basis. The amounts accrued for allowances and returns have not had a material impact on our financial condition or operating performance.

Property, Plant and Equipment

Property, plant and equipment are carried at cost and include expenditures for new facilities, major renewals and betterments. We capitalize the cost of furnace rebuilds as part of property, plant and equipment. Plant and equipment under capital leases are carried at the present value of minimum lease payments as determined at the beginning of the lease term. Maintenance, repairs and minor renewals are charged to expense as incurred. We capitalize certain internal costs associated with the implementation of purchased software. When property, plant and equipment is retired or otherwise disposed of, the net carrying amount is eliminated with any gain or loss on disposition recognized in earnings at that time. We also lease property, plant and equipment, principally under operating leases. Rent expense for operating leases, which may have escalating rentals or rent holidays, is recorded on a straight-line basis over the respective lease terms.

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Depreciation is provided on the straight-line method based on the estimated useful lives of the assets, which generally range from 15 to 33 years for buildings and improvements and 3 to 10 years for machinery and equipment. Leasehold improvements are depreciated using the straight-line method based on the shorter of the useful life of the improvement or remaining lease term. Interest cost associated with the development and construction of significant new plant and equipment is capitalized and depreciated over the lives of the related assets.

We perform an impairment review of property, plant and equipment and definite-lived intangible assets when facts and circumstances indicate that the carrying value of an asset or asset group may not be recoverable from its undiscounted future cash flows. When evaluating long-lived assets for impairment, if the carrying amount of an asset or asset group is found not to be recoverable, a potential impairment loss may be recognized. An impairment loss is measured by comparing the carrying amount of the asset or asset group to its fair value. Fair value is determined using quoted market prices when available, or other techniques including discounted cash flows. Our estimates of future cash flows involve assumptions concerning future operating performance, economic conditions and technological changes that may affect the future useful lives of the assets.

Goodwill and Intangible Assets

Goodwill and intangible assets with indefinite lives are not amortized, but are tested for impairment annually or more frequently if events occur or circumstances change that would more likely than not reduce the fair value of the reporting unit below its carrying amount. We perform our annual impairment tests of goodwill and indefinite-lived intangible assets as of October 1 of each year.

Goodwill is tested for impairment at the reporting unit level. In performing tests for goodwill impairment, we are permitted to first perform a qualitative assessment about the likelihood of the carrying value of a reporting unit exceeding its fair value. If an entity determines that it is more likely than not that the fair value of a reporting unit is less than its carrying amount based on the qualitative assessment, it is required to perform a two-step goodwill impairment test to identify the potential goodwill impairment and measure the amount of the goodwill impairment loss, if any, to be recognized for that reporting unit. However, if an entity concludes otherwise based on the qualitative assessment, the two-step goodwill impairment test is not required. The option to perform the qualitative assessment can be utilized at our discretion, and the qualitative assessment need not be applied to all reporting units in a given goodwill impairment test. For an individual reporting unit, if we elect not to perform the qualitative assessment, or if the qualitative assessment indicates that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, then we must perform the two-step goodwill impairment test for the reporting unit.

In applying the two-step process, the first step used to identify potential impairment involves comparing the reporting unit's estimated fair value to its carrying value, including goodwill. If the estimated fair value of a reporting unit exceeds its carrying value, goodwill is not impaired. If the carrying value exceeds the estimated fair value, there is an indication of potential impairment and the second step is performed to measure the amount of impairment, if any. The second step of the process involves the calculation of an implied fair value of goodwill for each reporting unit for which step one indicated potential impairment. The implied fair value of goodwill is determined in a manner similar to how goodwill is calculated in a business combination. That is, the estimated fair value of the reporting unit, as calculated in step one, is allocated to the individual assets and liabilities as if the reporting unit was being acquired in a business combination. If the implied fair value of goodwill exceeds the carrying value of goodwill assigned to the reporting unit, there is no impairment. If the carrying value of goodwill assigned to a reporting unit exceeds the implied fair value of the goodwill, an impairment charge is recorded to write down the carrying value. An impairment loss cannot exceed the carrying value of goodwill assigned to a reporting unit and the loss establishes a new basis in the goodwill. Subsequent reversal of an impairment loss is not permitted.

For the purposes of the quantitative goodwill impairment test, we determine the fair value of our reporting units using a split between a market approach and an income, or discounted cash flow, approach. Estimating the

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fair value of a reporting unit requires various assumptions including the use of projections of future cash flows and discount rates that reflect the risks associated with achieving those cash flows. The key assumptions used in estimating the fair value are operating margin growth rates, revenue growth rates, the weighted average cost of capital, the perpetual growth rate, and the estimated earnings market multiples of each reporting unit. The market value is estimated using publicly traded comparable company values by applying their most recent annual EBITDA multiples to the reporting unit's EBITDA for the trailing twelve months. The income approach value is estimated using a discounted cash flow approach. The assumptions about future cash flows and growth rates are based on our assessment of a number of factors including the reporting unit's recent performance against budget as well as management's ability to execute on planned future strategic initiatives. Discount rate assumptions are based on an assessment of the risk inherent in those future cash flows.

For intangible assets other than goodwill, definite-lived intangible assets are amortized over their respective estimated useful lives. Intangible assets with indefinite lives are not amortized, but rather are tested for impairment at least annually or more frequently if events occur or circumstances change that would more likely than not reduce the fair value of the intangible asset below its carrying amount. Our indefinite-lived intangible assets include trade names and certain trademarks. Similar to the goodwill impairment test, we may first assess qualitative factors to determine whether it is necessary to perform a quantitative impairment test. If we choose to bypass the qualitative assessment, or if the qualitative assessment indicates that the indefinite-lived intangible asset is more likely than not impaired, a quantitative impairment test must be performed. Unlike the goodwill impairment test, the quantitative test for indefinite-lived intangible assets is a one-step test comparing the fair value of the asset to its carrying amount. If the fair value of the indefinite-lived intangible asset is less than the carrying amount, an impairment loss is recognized in an amount equal to the difference.

The unit of accounting used to test our indefinite-lived intangible assets for impairment is at the reporting unit level. The fair values of our indefinite-lived trade names and trademarks are determined for impairment testing purposes based on an income approach using a discounted cash flow valuation model under a relief from royalty methodology. Significant assumptions under the relief from royalty method include the royalty rate a market participant may assume, projected sales and the discount rate applied to the estimated cash flows.

For definite-lived intangible assets, we amortize technical know-how over periods that range from fourteen to twenty years, customer relationships over periods that range from seven to fifteen years, trademarks over a fifteen year period, contracts over periods that range from two to sixteen years, and permits over five years. We perform an impairment review of definite-lived intangible assets when facts and circumstances indicate that the carrying value of an asset may not be recoverable from its undiscounted future cash flows. The impairment test for definite-lived intangible assets is consistent with the test applied to property, plant and equipment as described in our policy.

Pensions and Postretirement Benefits

We maintain defined benefit pension plans covering certain employees in the United States and Canada as well as certain employees in other international locations. Benefits for a majority of the plans are based on average final pay and years of service. Our funding policy, consistent with statutory requirements, is based on actuarial computations utilizing the projected unit credit method of calculation. Not all defined benefit pension plans are funded. In the United States and Canada, the pension plans' assets include equity and fixed income securities. Certain assumptions are made regarding the occurrence of future events affecting pension costs, such as mortality, withdrawal, disablement and retirement, changes in compensation and benefits, and discount rates to reflect the time value of money.

The major elements in determining pension income and expense are pension liability discount rates and the expected return on plan assets. We reference rates of return on high-quality, fixed income investments when estimating the discount rate, and the expected period over which payments will be made based upon historical

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experience. The long-term rate of return used to calculate the expected return on plan assets is the average rate of return estimated to be earned on invested funds for providing pension benefits.

In addition to pension benefits, we provide certain health care benefits for employees who meet age, participation and length of service requirements at retirement. We use explicit assumptions using the best estimates available of the plan's future experience. Principal actuarial assumptions include discount rates, present value factors, retirement age, participation rates, mortality rates, cost trend rates, Medicare reimbursement rates and per capita claims cost by age. Current interest rates, as of the measurement date, are used for discount rates in present value calculations.

Income Taxes

We operate within multiple taxing jurisdictions and are subject to tax filing requirements and audit within these jurisdictions. We use the asset and liability method in accounting for income taxes. Deferred tax assets and liabilities are recorded for temporary differences between the tax basis of assets and liabilities and their reported amounts in the financial statements, using statutory tax rates in effect for the year in which the differences are expected to reverse. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the results of operations in the period that includes the enactment date. We evaluate our deferred tax assets each period to ensure that estimated future taxable income will be sufficient in character (e.g., capital gain versus ordinary income treatment), amount and timing to result in their recovery. A valuation allowance is recorded to reduce the carrying amounts of deferred tax assets unless it is more likely than not that those assets will be realized. Considerable judgments are required in establishing deferred tax valuation allowances and in assessing exposures related to tax matters. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences and carryforward deferred tax assets become deductible or utilized. We consider the scheduled reversal of taxable temporary differences, projected future taxable income and tax-planning strategies in making this assessment. As events and circumstances change, related reserves and valuation allowances are adjusted to income at that time.

In determining the provision for income taxes, we provide deferred income taxes on income from foreign subsidiaries as such earnings are taxable upon remittance to the United States, to the extent that these earnings are considered to be available for repatriation. We do not provide income taxes on the cumulative unremitted earnings of foreign subsidiaries considered permanently reinvested. We establish contingent liabilities for possible assessments by taxing authorities resulting from uncertain tax positions including, but not limited to, transfer pricing, deductibility of certain expenses and other state, local, and foreign tax matters. We recognize a financial statement benefit for positions taken for tax return purposes when it will be more likely than not (greater than 50%) that the positions will be sustained upon tax examination, based solely on the technical merits of the tax positions, otherwise, no benefit is recognized. The tax benefits recognized are measured based on the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement. We recognize potential accrued interest and penalties related to unrecognized tax benefits in income tax expense. Tax examinations are often complex as tax authorities may disagree with the treatment of items reported by us and may require several years to resolve. These accrued liabilities represent a provision for taxes that are reasonably expected to be incurred on the basis of available information but which are not certain.

Stock-Based Compensation

We grant stock-based compensation awards in connection with our stock incentive plan. Under the terms of the incentive plan, we are authorized to issue equity awards to our employees, directors and affiliates. The awards granted have taken the form of restricted stock and stock options. Restricted stock awards provide the recipient with shares of our stock subject to certain vesting requirements. Stock option awards provide the recipient the ability to purchase shares of our stock at a given strike price upon the satisfaction of certain vesting requirements.

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The vesting requirements associated with the awards include a mix of both service and performance conditions. Depending on the award and recipient, the service condition may reflect a cliff vesting provision (e.g., 100% vested upon four years of service) or a graded vesting provision (e.g., 33.3% vested each year over a period of three years). Awards issued with performance conditions vest based on the occurrence of a defined liquidity event upon which certain investment funds affiliated with CCMP receive proceeds exceeding certain thresholds. Although achievement of the performance condition is subject to continued service with us, the terms of awards issued with performance conditions stipulate that the performance vesting condition can be attained for a period of six months following separation from service.

We recognize compensation expense related to our equity awards with service conditions on a straight-line basis over the stated vesting period for each award. Expense related to our equity awards with performance conditions is recognized in the period in which it becomes probable that the performance target will be achieved. No compensation expense has been recognized to-date on any of our equity awards subject to vesting based on performance conditions, since a liquidity event triggering vesting of the awards has not occurred, nor is it considered probable.

The grant date fair value of restricted stock awards is based on the value of the respective underlying stock. The fair value of our equity is determined using a market approach that considers our stock's liquidation preferences, financial performance and leverage, as well as market multiples of companies in similar industries. The grant date fair value of stock option awards is estimated using a Black-Scholes option pricing model. Determining the fair value of stock option awards at the grant date requires judgment, including estimates of the average risk-free interest rate, dividend yield, volatility and expected term. Since we have limited experience with respect to historical exercise and forfeiture rates or patterns, as well as no public market for our stock as a private entity, we have estimated certain assumptions using acceptable simplified methods and through benchmarking to our peer group of companies.

Recently Issued Accounting Standards

See Note 2 to the Unaudited Consolidated Financial Statements of PQ Group Holdings Inc. and Subsidiaries included elsewhere in this prospectus for a discussion of recently issued accounting standards and their effect on us.

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.

Foreign Exchange Risk

Our financial results 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 39% and 34% of our sales during the six months ended June 30, 2017 and the year ended December 31, 2016, respectively, coming from our international operations in currencies other than the U.S. dollar. Because 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 financial statements of our operations outside the United States, where the local currency is considered to be the functional currency, are translated into U.S. dollars using the exchange rate in effect at each balance sheet date for assets and liabilities and the average exchange rate for each period for sales, expenses, gains, losses and cash flows. The exchange rates between these

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currencies and the U.S. dollar in recent years have fluctuated significantly and may continue to do so in the future. 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. Sales in these top five currencies represented approximately 27% of our pro forma sales during the year ended December 31, 2016. A 10% change in these currencies would have impacted sales by approximately \$28.3 million, or 3% of pro forma sales assuming product pricing remained constant. The effect of translating foreign subsidiaries' balance sheets into U.S. dollars is included in other comprehensive income. The impact of gains and losses on transactions denominated in currencies other than the functional currency of the relevant operations are included in other non-operating expense. Income and expense items are translated at average exchange rates during the year. Net foreign exchange included in other expense was a \$3.6 million gain for the year ended December 31, 2016. The foreign currency loss realized in the year ended December 31, 2016 was primarily driven by the non-permanent intercompany debt denominated in local currency translated to U.S. dollars and was principally non-cash in nature.

Interest Rate Risk

We are exposed to fluctuations in interest rates on our Senior Secured Credit Facilities and on our Floating Rate 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 impact on our cash flow. As of December 31, 2016, a 100 basis point increase in assumed interest rates for our variable interest credit facilities, before impact of any hedges, would have an annual impact of approximately \$17.5 million on interest expense.

We hedge the interest rate fluctuations on debt obligations through interest rate cap agreements. We record the fair value of these hedges as assets or liabilities and the related unrealized gains or losses are deferred in stockholders' equity as a component of other comprehensive income (loss), net of tax. The interest rate caps had a fair value net asset of \$1.7 million and \$5.8 million at June 30, 2017 and December 31, 2016, respectively. 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, we entered into interest rate cap agreements, paying a premium of \$1.6 million to mitigate interest rate volatility from July 2016 through July 2020 by employing varying cap rates ranging from 1.50% to 3.00% on \$1.0 billion of notional variable debt.

Commodity Risk

We purchase significant amounts of natural gas to supply the energy required in our production processes for our products in each of our segments. Since we are a producer of inorganic chemicals, natural gas provides an energy source for us but is not a direct feedstock for our products. Therefore, exposure to the volatility in energy prices is less than that of producers of organic petrochemicals. We purchase approximately 15 million MMBtu's of natural gas in a given year. Thus, a \$1 increase in the cost of natural gas would impact our cost of goods sold by approximately \$15 million absent hedging. Our purchase agreements with our customers typically provide for the pass through of natural gas price increases; however, there is no guarantee that we will continue to be able to pass through future price increases without loss of existing customers. We have implemented a hedging program in the United States which allows us to mitigate exposure to natural gas volatility with natural gas swap agreements. We also make forward purchases of natural gas related to our production at certain subsidiary locations.

The natural gas swap agreements had a fair value net asset of \$0.1 million and \$0.6 million at June 30, 2017 and December 31, 2016, respectively. 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 assets are recorded in other current assets and other assets. The

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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.

Credit Risk

We are exposed to credit risk on financial instruments to the extent our counterparty fails to perform certain duties as required under the provisions of an agreement. We only transact with counterparties having an appropriate credit rating for the risk involved. Credit exposure is managed through credit approval and monitoring procedures.

Concentration of credit risk can result primarily from trade receivables, for example, with certain customers operating in the same industry or customer groups located in the same geographic region. Credit risk related to these types of receivables is managed through credit approval and monitoring procedures. In the year ended December 31, 2016, we wrote off \$0.2 million, or 0.02%, in bad debt on total sales of \$1,064.2 million.

Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

In August 2015, the board of directors of Eco Services Operations LLC ("Eco"), the accounting predecessor to PQ Group Holdings, discharged Deloitte & Touche LLP ("Deloitte") as its independent registered public accounting firm and determined that PricewaterhouseCoopers LLP ("PwC") would serve as its ongoing independent registered public accounting firm.

Deloitte has not issued any reports on PQ Group Holdings' financial statements for any period and has not issued any report on Eco for any period subsequent to December 31, 2014. Furthermore, during its engagement to audit Eco's 2014 consolidated financial statements, there were (a) no "disagreements" (as that term is defined in Item 304(a)(1)(iv) of Regulation S-K and related instructions) between Eco and Deloitte on any matter of accounting principles or practices, financial statement disclosure, or auditing scope or procedure, which disagreements, if not resolved to the satisfaction of Deloitte, would have caused Deloitte to make reference to the subject matter thereof in connection with its reports and (b) no "reportable events" (as that term is defined in Item 304(a)(1)(v) of Regulation S-K).

Prior to its engagement of PwC neither Eco or PQ Group Holdings, nor anyone on their behalf, consulted PwC regarding (i) the application of accounting principles to a specified transaction, either completed or proposed, or the type of audit opinion that might be rendered on Eco's or PQ Group Holdings' consolidated financial statements, and no written report or oral advice was provided to Eco or PQ Group Holdings by PwC that PwC concluded was an important factor considered by Eco or PQ Group Holdings in reaching a decision as to the accounting, auditing or financial reporting issue or (ii) any matter that was either the subject of a "disagreement" (as defined in Item 304(a)(1)(iv) of Regulation S-K and related instructions) or a "reportable event" (as defined in Item 304(a)(1)(v) of Regulation S-K).

PQ Group Holdings has provided Deloitte with a copy of this prospectus and requested that Deloitte furnish to PQ Group Holdings a letter addressed to the United States Securities and Exchange Commission stating whether Deloitte agrees with the above statements and, if not, stating the respects in which it does not agree. A copy of Deloitte's letter is attached as Exhibit 16.1 to the registration statement of which this prospectus forms a part.

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, customers demand consistent product quality and a reliable source of supply. Products sold to our customers can be highly value-added even when they represent only a small portion of the overall end-product costs, and success can be achieved by helping customers improve their product performance, value, and quality. As a result, operating margins in this sector have historically been high and generally stable through economic cycles. In addition, many products in these 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. The combination of attractive operating margins and moderate and generally predictable maintenance capital expenditure requirements can produce attractive cash flows. Our industry is also characterized by the need to produce consistent quality in a safe and environmentally sustainable manner.

Summary End Uses & Demand Drivers

The table below summarizes our key end uses and products as well as the significant growth drivers in those applications.

Key End Uses	2016 Pro Forma Sales and Zeolyst Joint Venture Total Net Sales⁽¹⁾⁽²⁾	Significant Growth Drivers	Key PQ Products
Fuels & Emissions Controls	20%	<ul style="list-style-type: none"> • Global regulatory requirements to: <ul style="list-style-type: none"> • Remove nitrogen oxides from emissions • Remove sulfur from diesel and gasoline • Increase gasoline octane in order to improve fuel efficiency while lowering vapor pressure to regulated levels for premium fuels • Improve lubricant characteristics to improve fuel efficiencies 	<ul style="list-style-type: none"> • Refinery catalysts • Emissions control catalysts • Catalyst recycling services
Consumer Products	18%	<ul style="list-style-type: none"> • Substitution of silicate materials for less environmentally friendly chemical additives in detergent and cleaning end uses • Demand for improved quality and shelf life of beverages • Demand for improved oral hygiene and appearance 	<ul style="list-style-type: none"> • Silica gels for edible oil and beer clarification • Precipitated silicas and zeolites for the surface coating, dentifrice, and dishwasher and laundry detergent applications
Highway Safety & Construction	16%	<ul style="list-style-type: none"> • Demand for enhanced “dry and wet” visibility of road and airport markings to improve safety • Drive for weight reduction in cements 	<ul style="list-style-type: none"> • Reflective markings for roadways and airports • Hollow glass beads, or microspheres, for cement additives

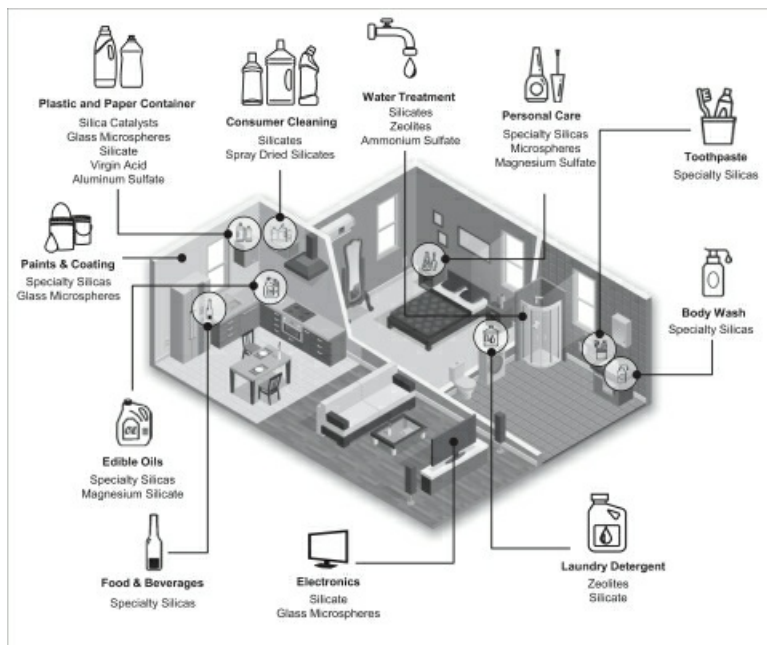
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	2016 Pro Forma Sales and Zeolyst Joint Venture Total Net Sales ⁽¹⁾⁽²⁾	Significant Growth Drivers	Key PQ Products
Packaging & Engineered Plastics	17%	<ul style="list-style-type: none"> • Demand for increased process efficiency and reduction of by-products in production of chemicals • Demand for high-density polyethylene lightweighting of automotive components • Enhanced properties in plastic composites for the automotive and electronics industries 	<ul style="list-style-type: none"> • Catalysts for high-density polyethylene and chemicals syntheses • Antiblocks for film packaging • Solid and hollow microspheres for composite plastics
Industrial & Process Chemicals	21%	<ul style="list-style-type: none"> • Demand in the tire industry for reduced rolling resistance • Usage of silicate in municipal water treatment to inhibit corrosion in aging pipelines • Growth in manufacturing in North America driving demand for metal finishing 	<ul style="list-style-type: none"> • Silicate precursors for the tire industry • Silicate for water treatment • Glass beads, or microspheres, for metal finishing end uses
Natural Resources	8%	<ul style="list-style-type: none"> • More environmentally friendly drilling fluids for oil and gas production • Recovery in global oil drilling / U.S. copper production • Growing demand for lighter weight cements in oil and natural gas wells 	<ul style="list-style-type: none"> • Silicates for drilling muds • Hollow glass beads, or microspheres, for oil well cements • Sulfur derivatives for copper mining • Bleaching aids for paper

- (1) Pro forma information gives effect to the consummation of the Business Combination and the related financing transactions as if they occurred on January 1, 2015.
- (2) Percentage calculations include \$131.3 million of total net sales attributable to our Zeolyst Joint Venture, which represents 50% of its total net sales for the year ended December 31, 2016. See footnote (4) to “Summary Historical and Unaudited Pro Forma Financial and Other Data” for a description of the treatment of our Zeolyst Joint Venture in our consolidated financial information.

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The schematics below showcase certain applications that use our products.



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Fuels & Emissions Controls

Favorable industry dynamics in the fuels and emission controls industries are driving increased demand and the need for constantly evolving product specifications for our catalyst products. These growth dynamics include increasingly stringent global emission control standards for heavy- and light-duty vehicles regulatory standards regarding vehicle mileage and fuel composition, and increased supply of natural gas by-products driven by shale gas proliferation in the United States.

Emissions Control

Diesel Engine Standards. We believe demand for our zeolite-based catalyst will grow significantly due to continued tightening of global diesel emissions standards in both on-road and non-road diesel engines. Non-road diesel engines refer to heavy-duty diesel engines used in machinery or equipment, including locomotives and marine vessels. We believe that increased global awareness and the desire to reduce pollution from stationary and mobile pollution sources have increased the importance of emissions control catalysts.

On-Road Emissions Standards. Emission standards for heavy-duty diesel engines in the United States were first developed by the EPA in 1974. These emissions standards have progressively been tightened over time by a series of regulations called Tier 1 through Tier 3. The current emissions standard, Tier 3, for heavy-duty engines was phased in between 2007 and 2010. For example the standard for allowable nitrogen oxides emissions was 6.0 grams per brake horsepower-hour (“g/bhp-hr”) in 1990 versus the current 0.2 g/bhp-hr. Light-duty vehicles also have Tier 1 through Tier 3 standards that were originally part of the Clean Air Act of 1990. The current light-duty standard is Tier 3, which is to be phased in during 2017 and is scheduled to extend through 2025.

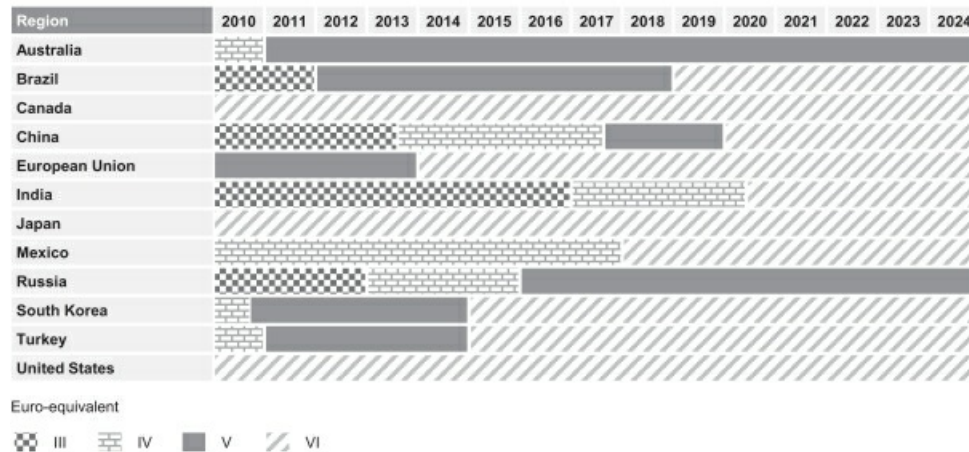
European emissions regulations for heavy-duty diesel engines are referred to as Euro I through Euro VI. Euro I standards were introduced in 1992 and the current Euro VI standards became effective in 2013 and 2014. An example of the increasingly stringent requirements for nitrogen oxides emissions is the standard of maximum allowable emissions of 8.0 grams per kilowatt-hour (“g/kWh”) under Euro I versus the current Euro VI maximum of 0.40 g/kWh. Light-duty vehicles have a similar set of increasingly stringent standards, called Euro 1 through Euro 6

Non-Road Emissions Standards. The EPA has adopted the standards for non-road diesel engines. Such standards were first adopted in 1994 and initially implemented between 1996 and 2000. These standards are known as Tier 1 through Tier 4 standards. The current standard, Tier 4, was phased in between 2008 and 2015. As an example, for larger engines, above 56 kW, the current Tier 4 nitrogen oxides standard is 0.40 g/kWh compared to the Tier 1 through Tier 3 standard of 9.2 g/kWh.

Likewise, the European Standards regulations for non-road engines have been structured as gradually more stringent tiers known as Stage I through V regulations. The first European legislation to regulate non-road engines was promulgated in 1997 and Stage I was implemented in 1999. The current Stage IV was implemented in 2014, and Stage V is expected to become effective in 2019 or 2020.

Global Emissions Standards. In many cases countries have established regulations that generally follow United States Environmental Protection Agency or European Union standards, but typically on a later implementation timeline. The chart below identifies each country’s regulatory requirements in relation to the most comparable European Union standard for ease of comparability. In addition, even more restrictive regulations are expected to be adopted in the future in many jurisdictions, such as EU VII, which would further reduce permitted emissions levels in the European Union. We believe that compliance with existing regulations as well as any future regulations provides us with opportunities to grow our sales of emissions control catalysts.

Timeline for Implementation of Regionwide Emissions Standards for Diesel Heavy-Duty Vehicles in European Union Equivalent Standards



Source: The International Council on Clean Transportation

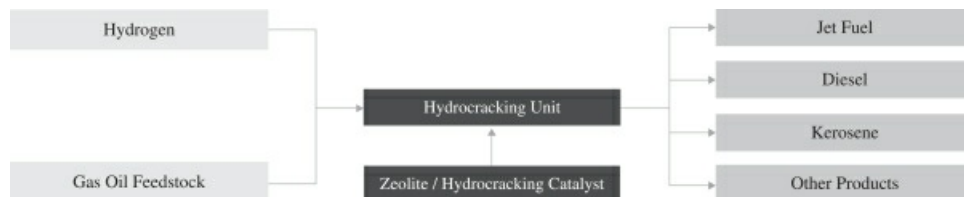
The demand for catalysts is also expected to grow due to the increasing use of these diesel engines, driven in part by the development and industrialization of emerging economies and anticipated global growth in gross domestic product. Heavy-duty vehicle production is expected to grow at a compound annual growth rate of 4.1% globally from 2015 to 2020, according to ACT Research. In addition, light-duty vehicle production is expected to grow at a compound annual growth rate of 2.8% from 2015 to 2020, according to LMC Automotive.

Fuels

Refining Dynamics—Hydrocracking. Sales of our hydrocracking catalysts are expected to grow due to the increasingly stringent demands for lower sulfur content in fuels and the continued global trend towards processing heavy sour crudes, which have a higher sulfur content.

A hydrocracking unit is fed gas oil, which is heavier and has a higher boiling point than distillate fuel oil, and cracks these heavy molecules into distillate and gasoline in the presence of hydrogen and a catalyst. The hydrocracking process upgrades low-quality heavy gas oils into high-quality jet fuel, diesel, and gasoline. The rate of cracking and the end-products produced are dependent on the operating parameters and design of the hydrocracking catalysts. Below is an overview of the hydrocracking process for the production of diesel and other refinery products.

Hydrocracking Process (Within a Refinery)



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The hydrocracking unit initially requires larger quantities of catalyst and then requires smaller replacement quantities of catalyst each year until an entire replacement of catalyst is needed every 2 to 4 years.

Refiners have been installing hydrocrackers in response to increasing global demand for jet fuel, diesel, and kerosene. The hydrocracker also converts high-sulfur materials (lower value) into low-sulfur fuels (higher value) for vehicles and airplanes. Many countries have enacted increasingly stringent environmental laws to require lower sulfur content in diesel fuels. As a result, we believe that more hydrocracking capacity will be required to remove increasing amounts of sulfur from diesel fuels, particularly with increased use of sour crude. The table below summarizes certain sulfur regulations for diesel fuel.

Standards Regulating Sulfur in Diesel Fuel

Regionwide Diesel Sulfur Limits (Parts per Million)

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Brazil	3,500	2,000		1,800-500 transition		500										
China	2,000		350		50		10									
European Union	50		10													
India	500		350													
Japan	50	10														
Russia	500		350		50	10										
South Africa	3,000	500 (50 in some markets)		10												
Thailand	150		50													
United States	500	15														

Source: International Council on Clean Transportation and DieselNet

Although the cost of hydrocracking catalysts are relatively small compared to the overall costs for operating a refinery, the consequence of a refiner using a low quality or contaminated catalyst could be significant. As a result, refiners generally choose to purchase high quality catalysts from well-known manufacturers and they typically value performance and reliability over price when making buying decisions.

Refining Dynamics—Alkylates. We believe our refining services products will benefit from regulations mandating higher vehicle fuel mileage and increasingly stringent fuel specifications. These trends create the need for higher octane in gasoline, which creates opportunities for our refining services product group. In addition, North American refineries are experiencing an increase in light olefins as a result of the increased use of shale oil and are therefore expected to increase demand for alkylation catalysts. We also expect that the relatively lower costs of gasoline will result in increased U.S. exports, which can help maintain refinery utilization in the U.S. gulf coast region.

The United States has regulated fuel economy for light-duty vehicles since the 1970s. The Corporate Average Fuel Economy (“CAFE”) standards were initially developed in 1975 and expanded in 2009 to include greenhouse gas emissions. Future standards are being considered for vehicle models developed between 2017 and 2025 which, if implemented as currently contemplated, would increase the fuel economy standard from 34.1 miles per gallon for vehicle models developed in 2016 to 49.6 miles per gallon for vehicle models developed in 2025.

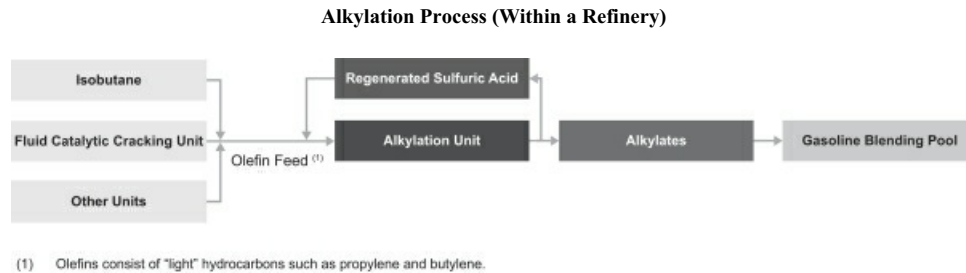
In order to adapt to these potential regulations, automakers are making a variety of design changes to vehicles. One of these changes is to use smaller, more efficient turbocharged engines to increase power to compensate for the increased fuel economy. In addition, as consumers move to these more efficient engines to save money or gain engine performance, gasoline needs to have higher octane in order to run these high compression engines and to prevent “knock” or premature detonation of the fuel in the cylinder, which can damage engines. According to the Energy Information Administration, these shifts in engine design are expected

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to continue as automakers increase the use of turbocharging as one of the strategies to comply with increasingly stringent fuel economy standards.

Alkylates are a preferred blending component for gasoline because they boost octanes, while lowering vapor pressure, at more environmentally friendly specifications relative to other octane sources such as ethanol and butane. The Environmental Protection Agency, through the Clean Water Act regulations has reduced the maximum allowable vapor pressure and aromatic, benzene, and sulfur content in fuel. Alkylates are high octane sources with low vapor pressures, no olefins, no aromatics, and low sulfur.

The alkylation unit is a conversion process in the refinery used to convert olefins and isobutane, volatile and light compounds, from the fluid catalytic cracking unit and other units into high octane gasoline blending components. The alkylate produced from the unit are used as a premium gasoline blending stock because of their anti-knock and clean burning characteristics.



Alkylation units in refineries use either sulfuric acid or hydrofluoric acid as the catalyst material. Sulfuric acid has been the preferred technology due to its lower maintenance costs, safer handling, more environmentally friendly profile, and product quality. Hydrofluoric acid also is a more hazardous substance that typically requires additional safety precautions. Sulfuric acid catalysts are consumed as part of the alkylation process, and therefore need to be continually replaced with fresh catalyst. Sulfuric acid is used in approximately half the refining capacity in the United States. We believe that government regulations as well as the characteristics of sulfuric acid compared to hydrofluoric acid will cause refiners to select sulfuric acid technology in building or converting new alkylation units.

There are significant shale natural gas deposits in the United States. The United States Energy Information Administration predicts that by 2035, 46% of the United States' natural gas supply will come from shale gas. The proliferation of shale gas has increased natural gas liquids production in the United States from 2.1 million barrels per day ("MMbbl/day") in 2010 to 3.6 MMbbl/day by February 2017 according to the Energy Information Administration. Alkylation units are used to upgrade natural gas liquids, which are light, lower value compounds, to higher value-added refined products that can be blended into the gasoline pool. The Organization of the Petroleum Exporting Countries expects 74% of oil production growth for 2017 in the United States to be driven by the expanding production of shale oil, which would result in higher production of refined products. In addition, these refined products are increasingly being exported due to the historically lower cost of natural gas in the United States. According to the Energy Information Administration, exports of refined gasoline products from the United States have increased from 2.0 MMbbl/day in 2010 to 3.0MMbbl/day in 2016.

According to the Energy Information Administration, the demand in the United States for premium gasoline, which has higher octane and alkylate content than regular gasoline, grew at a compound annual growth rate of 6.1% from 2011 to 2016 as a result of higher octane requirements in higher turbocharged compression engines. The number of turbocharged light-duty vehicles in the United States is expected to make up approximately 83% of all light-duty vehicles by 2025, a significant increase from approximately 18% in 2014, which we believe will increase the demand for higher-octane gasoline. Higher production of natural gas liquids and increased demand for premium gasoline is expected to drive higher alkylation utilization and capacity.

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Consumer Products

We sell a variety of our products as additives, ingredients, and precursors for consumer products. This industry generally has not exhibited as pronounced cyclicity as other industries because products such as cosmetics, toiletries, and cleaning products are vital to consumer's daily routines. Examples of such products include toothpaste, hair and skin care products, Epsom salt and automatic dishwashing detergents. We also address food and beverage applications such as materials for purification of beer and cooking oil. Growth in these end uses is expected to be driven by shifting consumer preferences, consumer demand for safer and more environmentally friendly products, and the increased demand for consumer products as a result of global demographic and development trends.

Consumer products companies compete by constantly investing to improve their product's quality and performance. This improvement is critical to maintain their competitive advantage and brand equity in a dynamic industry that is constantly responding to shifting consumer preferences. We produce additives and ingredients that allow these companies to develop new products. For example, we have collaborated with leading consumer products companies over a number of years to develop a family of gentle silica-based dentifrice abrasives that produce more effective cleaning toothpastes.

Another key trend has been the increased demand by consumers for more sustainable, safe, and environmentally friendly products. Consumer products manufacturers have been challenged to develop products that meet these constraints without compromising quality and performance. Consumers have an increased awareness of product safety through online resources such as government databases and social media. Products such as cosmetics and toiletries are now more often promoted with labeling indicating that the product is free from harmful ingredients. For example, some cosmetics include labeling that indicates no parabens, sulfates, silicones, or petroleum derivatives. In addition, some consumers are more concerned about the environmental impact and sustainability of the products they use as evidenced by consumer products companies' marketing campaigns and product branding addressing those issues. Our performance materials and chemicals business produces materials which are often being used as a substitute for other materials because our products are more environmentally friendly. For example, our specialty silicates are displacing phosphates in dish detergents and our silicate and silicate derivatives are recognized on the EPA's Safer Chemicals Ingredients List for its Safer Choice products program.

In addition, demographic shifts in developed economies and wealth proliferation in developing economies are also driving increased demand for consumer products. In addition, the growth of the middle class in countries such as China and India are also driving growth of consumer products. According to an industry source, the consumption of cosmetic chemicals is expected to grow on average at 3.8% globally, 7.9% in China, and 3.6% in other Asian countries (excluding Japan) between 2015 and 2020.

Highway Safety and Construction

Demand for our performance materials products is expected to grow due to favorable highway and construction industry dynamics including increased highway safety expenditures, product innovation in highway safety, and formulations shifts in adhesives, cements, and coatings.

Highway Safety. We produce highway and runway marking products that are used in the highway safety industry. Highway safety spending is generally predictable given the ongoing replacement and maintenance requirements as a result of road use. Road maintenance and road construction spending have historically been resilient during economic downturns as they are often used as a form of government stimulus.

Growth drivers in highway safety include the need to invest in the aging United States highways and local roadways, the aging of populations in developed economies which increases the need for greater pavement marking visibility, increased public awareness of the costs associated with road injuries and fatalities and to

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address concerns from autonomous vehicle manufacturers. We believe that our road marking products can be very cost effective investments to address these trends. Demand for road markings in excess of periodic maintenance and road construction is expected to come from the implementation of brighter lines, more roads with edge lines, wider lines and more use of double lines to improve safety. As a result of these trends, United States federal highway spending has increased in seven of the ten years between 2005 and 2015.

Highway safety spending in developing economies is expected to grow faster than in developed economies as a result of their faster pace of construction of road infrastructure. Road marking in Europe and Japan generally exceed those in the United States, which we believe is a growth opportunity for our highway safety products to the extent the United States seeks to achieve similar standards.

Construction. Our products are additives for many construction products such as adhesives, cements, grouts, and surface coatings. Trends in this sector include the need for improved performance in products to address construction and infrastructure challenges such as customer requirements for more reliable and longer lasting materials. In addition, the trend toward more environmentally friendly products is also driving new product development. Growth in these products is driven by construction for new residential, commercial, and institutional infrastructure and for maintenance of existing infrastructure. Adhesives and coatings make up a large portion of the demand. According to an industry source, the coatings industry is expected to grow at a compound annual growth rate of 4% from 2016 to 2021.

According to an industry source, demand for adhesives in North America, Western Europe and Japan is expected to grow at a compound annual growth rate of 1 to 3% from 2016 to 2021. In contrast, demand for adhesives in China is expected to grow at a compound annual growth rate of 6% from 2016 to 2021.

Additives into these applications are usually only a small portion of the overall product cost yet they are critical to product performance. For example, in coatings, additives seldom exceed 5% of the volume of the formulation versus higher volume components such as resins, solvents (if solvent-based versus water-based), and pigments. These additives are priced based on performance and generally have high and stable margins. For example, we produce products that act as matting agents in coatings that replace more expensive materials in the coating formulation such as strontium chromate while maintaining product performance.

Regulations and consumer preferences are driving our customers to develop more environmentally friendly products such as coatings that meet global and local volatile organic compounds (“VOC”) requirements. Our products are used in waterborne coatings that are growing as a result of this low VOC requirement trend. We also supply our silicates for use in geopolymer products, a more environmentally friendly alternative to portland cements. Our additives allow for the geopolymer products to be manufactured at room temperature from waste materials resulting in a lower carbon footprint at a lower cost for customers.

Packaging and Engineered Plastics

We believe our catalysts and performance materials product will benefit from the continued growth in plastics in consumable and durable end use applications. Specifically, sales of plastics, such as polyolefins, nylons, and acrylics, continue to grow by displacing traditional materials, such as metal, glass, and wood in packaging, container, display, and building product end uses among others. Engineered plastics are expected to continue displacing metal in automotive, aerospace, and electronics applications to lightweight vehicles in response to fuel mileage standards, such as CAFE standards, and increased performance and reliability trends. Engineered plastics also add increased chemical and weather resistance among other attributes as compared to substitute products.

Polyolefins. Our catalysts and catalysts supports are used in the production of HDPE, which is a high strength and high stiffness polyethylene used in packaging films, bottles, containers, and other molded applications. According to an industry source, North American HDPE capacity is expected to grow at a

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compound annual growth rate of 5.1% from 2016 to 2020, driven by general economic activity growth and the increased utilization of HDPE as a substitute for heavier and more expensive materials such as glass and metals. Further, we believe that we are well positioned to benefit from the increased HDPE capacity being built in the United States, due to our strong competitive position, and also as a result of ongoing investment in the United States by petrochemical companies given access to lower cost United States shale gas.

Engineered Plastics. Demand for acrylic plastics such as polymethyl methacrylate (“PMMA”), the polymer methyl methacrylate (“MMA”), is growing due to the displacement of glass in furniture, signage, and auto components. PMMA, also known as acrylic, is a clear scratch-resistant plastic used in sheet or molded form to replace glass and as a durable surface coating. A new MMA production facility requires an initial amount of catalyst and then requires smaller replacement amounts each year. According to an industry source, global MMA capacity is expected to grow at a compound annual growth rate of 3% from 2016 to 2021.

Composites. Composites are increasingly used as a component in the manufacture of automotive vehicles, given their lightweight properties in order to meet tightening mileage and performance standards. One type of composite is a plastic that is mixed while with a reinforcement material. Our solid and hollow microspheres are used as reinforcement material to produce composites that are lightweight and able to displace heavier plastics. These low-cost and anti-warping additives used in these composite formulations assist in the processing and use of plastics. In automobiles, composites are also displacing metal to reduce weight while performing to required standards. Given these trends, demand for composites in the United States is expected to grow at a compound annual growth rate of 4.9% from 2016 to 2022 according to Composites Manufacturing Magazine.

Industrial & Process Chemicals

Industrial and process chemicals encompass a combination of diverse end uses where our chemicals are used as ingredients, precursors, and additives into chemical and industrial company products and applications. Key end uses for our products include green tires where our silicate precursors assist in reducing rolling resistance, municipal water treatment, where our silicates are used to inhibit pipeline corrosion, and in global manufacturing, where our performance materials are used in metal finishing. In addition to any growth consistent with general economic growth, we believe that demand for our products will also benefit from the trend toward more environmentally friendly products, such as in the green tire end use.

Green Tire. Increasingly stringent fuel mileage standards for automobiles and deteriorating air quality are driving automobile manufacturers to use alternative products to reduce vehicle emissions. Green tires have been developed to perform with lower rolling resistance than standard tires to reduce fuel consumption and the resulting emissions. The performance is enabled by a formulation in which precipitated silica and silanes are added to replace carbon black to achieve up to an 8% savings of fuel consumption. The amount of precipitated silica in green tires is double the amount in standard tires. The demand for precipitated silica in green tires is expected to grow at a compound annual growth rate of 10.6% from 2015 to 2020, according to Notch Consulting.

Water Treatment. Our silicates are used in water treatment chemicals as an inorganic corrosion inhibitor. Silicates provide protection to iron and steel by prohibiting corrosion by forming a protective layer in the pipe. The water treatment industry has been relatively stable given the continual need for clean municipal water independent of business cycles. We believe this industry will grow as a result of increasing water purity standards worldwide.

Metal Finishing. Our performance materials products are cost-effective, highly reliable abrasives used in metal finishing processes used in cleaning, peening, finishing and deburring metals. Our products are also used to surface-treat wood, stone, ceramics and glass. The metal finishing process is most prevalent in the aerospace and defense, automotive, and general industrial manufacturing industries where metal surfaces are hardened, such as for compressor blades in aerospace and power generation industries. We believe that our performance materials products are a preferred substitute for other media such as industrial sand, aluminum oxide, iron, and steel,

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because they do not damage parts but do allow for better process control, limit surface contamination, and are more environmentally friendly.

Natural Resources

We supply products to the oil and gas industry as ingredients and additives into oilfield chemicals for completion materials and drilling fluids. Completion materials, such as cement, are used after drilling in order to set a well for production, i.e. extraction of the oil and gas. In addition, we supply materials that are used in the production of metals in the mining process, such as in copper mining.

The oil and gas industry in the United States experienced a significant downturn which began at the end of 2014, with the decline in oil prices. The drilling and completion of wells declined significantly in response to the weak oil price environment. According to Wood Mackenzie, drilling and completion spending in North America fell 68% from 2014 to 2016. Some of our products are used in the oil and gas industry as additives to the cement used in well completions and solid microspheres added in to oil-driving muds. Sales of our products to the oil and gas industry declined in line with the decline in activity levels in this industry. According to an industry source, North American rig counts have more than doubled since June 2016 with U.S. shale oil drilling activity in the United States experiencing a recovery as compared to 2016 levels. Drilling and completion activity is expected to continue to recover. According to an industry source, upstream exploration and production annual spending in North America is expected to reach \$233 billion in 2021, or 71% of 2014 peak spending levels, compared to \$131 billion expected for 2017.

In the mining industry, we sell sulfuric acid that is used by mining companies in the recovery and leaching of copper from ores. Global copper consumption has typically grown in line with gross domestic product, driven by the industrialization of developing economies, global urbanization, and increasing global power demand. Because our customers generally operate mines at predictable output volumes regardless of commodity price, as consumer consumption tends to be inelastic, our sulfuric acid sales have historically been relatively stable and predictable. Customers in the mining industry are one of the few types of sulfuric acid customers who can buy acid from any location. We supply large mines in the western United States. Given the proximity of our manufacturing locations to the mines, we are able to limit our freight costs for our virgin sulfuric acid.

BUSINESS

We are a global provider of catalysts, specialty materials and chemicals, and services with leading supply positions across our portfolio. We compete in the global specialty chemicals and materials industry where we seek to focus on attractive, high-growth applications. Our products and services provide critical performance to our customers' products and we are able to offer many of our customers regionally sourced materials to reduce costs and improve delivery logistics. We provide our customers with a combination of product technology and applications knowledge, global supply chain capabilities, and local production and logistical support. We have two reporting segments: environmental catalysts and services and performance materials and chemicals. In our environmental catalysts and services segment, we have three product groups: silica catalysts, zeolite catalysts, and refining services. In our performance materials and chemicals segment, we have two product groups: performance materials and performance chemicals. Through these product groups we serve a diverse set of end uses and geographies.

The table below summarizes certain information regarding our two reporting segments and our five product groups for the year ended December 31, 2016. For additional financial information regarding our reporting segments, please see Note 12 to the audited consolidated financial statements of PQ Group Holdings Inc. and subsidiaries included elsewhere in this prospectus.

(Dollars in millions) Segments and Product Groups	Year ended December 31, 2016									
	Sales	% of Total Sales	Pro Forma Sales(1)	Zeolyst Joint Venture Total Net Sales(2)	% of Total Pro Forma Sales and Zeolyst Joint Venture Total Net Sales(1)(2)(3)	Net Loss	Pro Forma Adjusted EBITDA(1)(2)	% of Total Pro Forma Adjusted EBITDA(1)(2)(4)	Estimated Supply Share Position(5)	
Environmental Catalysts and Services:										
Silica Catalysts	\$ 53.0	5.0%	\$ 84.2	\$ —	5.5%				#2	
Zeolite Catalysts	—	—	—	131.3	8.5%				Primarily #1 or #2	
Refining Services	373.7	35.0%	373.7	—	24.3%				#1	
Subtotal	\$ 426.7	40.0%	\$ 457.9	\$ 131.3	38.3%		\$ 221.8	48.9%		
Performance Materials and Chemicals:										
Performance Chemicals	\$ 437.5	41.0%	\$ 663.9	\$ —	43.2%				Primarily #1(6)	
Performance Materials	206.5	19.4%	291.3	—	19.0%				Primarily #1(7)	
Sales Eliminations	(5.0)	(0.4%)	(8.0)	—	(0.5%)					
Subtotal	\$ 639.0	60.0%	\$ 947.2	\$ —	61.7%		\$ 231.8	51.1%		
Eliminations / Corporate	(1.5)		(2.1)	—			(32.8)			
Total	<u>\$1,064.2</u>	<u>100.0%</u>	<u>\$1,403.0</u>	<u>\$131.3</u>	<u>100.0%</u>	<u>\$(79.7)</u>	<u>\$ 420.8</u>	<u>100.0%</u>		

- (1) Pro forma information gives effect to the consummation of the Business Combination and the related financing transactions as if they occurred on January 1, 2015.
- (2) Percentage calculations include \$131.3 million of total net sales attributable to our Zeolyst Joint Venture, which represents 50% of its total net sales for the year ended December 31, 2016. See footnote (4) to "Summary Historical and Unaudited Pro Forma Financial and Other Data" for a description of the treatment of our Zeolyst Joint Venture in our consolidated financial information.
- (3) Percentage calculations exclude \$2.1 million in intersegment sales eliminations.
- (4) Percentage calculations exclude \$32.8 million in corporate expenses.
- (5) Estimated supply share positions are based on management's estimates based on the 2016 sales volume and represent our estimated global supply share positions for each of our product groups, except that the estimated supply share position for our refining services product group reflects our estimate of only our supply share position in the United States and excludes volume attributable to manufacturers who produce primarily for their own consumption.
- (6) We believe we hold #1 supply share positions with respect to products that accounted for approximately 73% of our performance chemicals product group's 2016 pro forma sales, and that we hold #2 supply share positions with respect to products that accounted for the remaining approximately 27% of our performance chemicals product group's 2016 pro forma sales.

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- (7) We believe we hold #1 supply share positions with respect to products that accounted for approximately 89% of our performance materials product group's 2016 pro forma sales, and that we hold #2 supply share positions with respect to products that accounted for the remaining approximately 11% of our performance materials product group's 2016 pro forma sales.

Environmental Catalysts & Services

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 emission control for engines. Our catalysts are highly technical and customized for our customers, and can require up to ten years of development and collaboration with customers in order to commercialize. Catalyst specifications are constantly evolving in order to address changing customer demands and requirements for lower cost and improved quality. As a result, we must continuously collaborate with our customers to create new and more efficient pathways for the production of chemicals and fuels. Our environmental catalysts and services business consists of three product groups: silica catalysts, zeolite catalysts, and refining services.

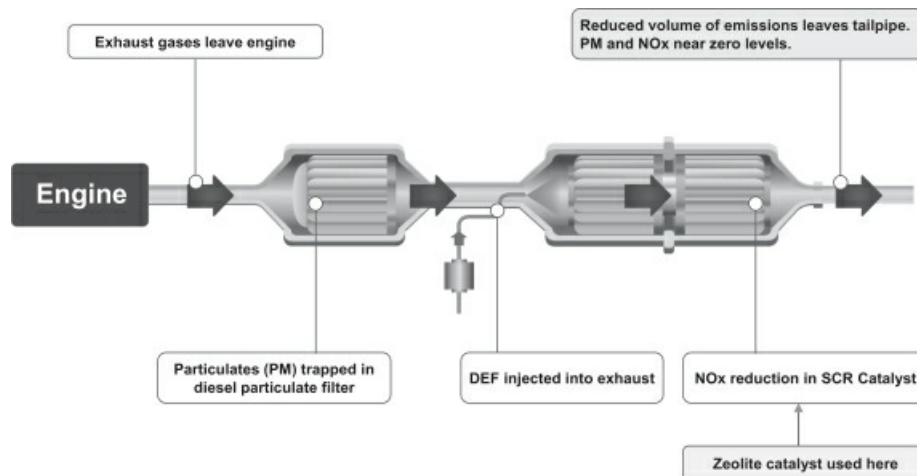
Silica Catalysts. In our silica catalysts product group, we sell both the finished catalyst and catalysts supports, which are critical catalyst components, for the production of HDPE, a high strength and high stiffness plastic used in packaging films, bottles, containers, and other molded applications. We also produce a catalyst that is used globally for the production of methyl methacrylate, the monomer for acrylic engineering resins, a clear scratch-resistant plastic used in sheet or molded form to replace glass and as a durable surface coating. Because these catalysts are highly technical and customized for our customers to produce resins with specific properties, they are often covered under long-term supply agreements and, in some cases, we are a customer's sole source supplier. In addition, we produce silicas products that are used to prevent opposite faces of polyolefin and polyester films from adhering to one another during manufacturing or otherwise.

Zeolite Catalysts. Our zeolite catalysts product group is a leading global supplier of emissions control catalysts as well as a supplier of specialty catalysts, precursors, and formulations to refineries and downstream petrochemicals and chemical companies. We operate this product group through our Zeolyst Joint Venture. These specialty zeolite-based catalysts are sold to the emissions control industry for use in diesel emission control units in both on-road and non-road diesel engines. In addition, our zeolite catalysts product group is a leading supplier to the hydrocracking catalyst industry as a direct seller and supplier to other catalyst suppliers.

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Our specialty zeolite catalysts are used in an advanced emission control technology called selective catalytic reduction. This process uses ammonia to react with engine exhaust gases via our catalysts in order to convert nitrogen oxides, a pollutant, into nitrogen and water. We believe that our zeolite catalysts can enable selective catalytic reduction technology to reduce the amount of nitrogen oxides in such exhaust gases by more than 90%. A schematic of a typical diesel emissions control system is below.

Representative Diesel Emissions Control System



We believe that this technology is one of the most cost-effective methods to reduce diesel engine emissions. Emissions control regulations have created demand for this technology and we believe that future regulations will generate additional growth and development opportunities for this technology and, as a result, our zeolite catalysts and precursors.

Our Zeolyst Joint Venture is a long-standing partnership dating back to 1988, which combines our expertise in zeolites supply and technology with our partner's expertise in global refinery catalyst sales and technology. We supply sodium silicates from our performance chemicals product group to the Zeolyst Joint Venture to make specialty zeolites, which are used as precursors in emissions control and custom catalysts. We also produce specialty zeolites that are precursors for the production of hydrocracking catalysts and other refinery and petrochemical catalysts that are used by our other product groups and sold to third parties. We manage the production of these specialty zeolites given our expertise in zeolite production. These catalysts include aromatic catalysts that upgrade aromatic by-product streams, dewaxing catalysts that improve lube oil performance and diesel cold flow performance, and paraffin isomerization catalysts that upgrade olefins to high octane gasoline blending components, for refinery and petrochemical customers.

Refining Services. Sulfuric acid is the primary catalyst used in the production of alkylates for gasoline production at refineries. Alkylates are a critical additive that increase octane in gasoline at low vapor pressure, which is needed in order for turbocharged engines to meet increasingly stringent fuel efficiency standards. Our refining services product group provides recycling and end-to-end logistics for refiners who use sulfuric acid in their alkylation units. These recycling units also produce virgin sulfuric acid and sodium bisulfate, which we sell into the water treatment, mining, and general industrial and chemicals industries.

After sulfuric acid is used in an alkylation unit, it becomes spent acid, which is diluted with water and hydrocarbons, and then needs to be recycled before it can be reused. Sulfuric acid regeneration enables refineries to manage their spent acid and obtain fresh acid for reuse in their alkylation processes. Because storage space for fresh

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and spent acid is typically limited, and the cost to refineries of interruption to their alkylation units would be significant, refineries seek to have a continuous and reliable source of supply for sulfuric acid. By providing regeneration services, as well as purchasing by-product sulfur from customers as a source of energy and for use in manufacturing virgin sulfuric acid, we believe that we provide our refining customers with a full solution for their sulfuric acid needs. Our refining services product group is highly regionalized due to shipping costs and our customer integration requirements. Our facilities are located near or, in some cases, within our customers' refineries and our products are often supplied directly to our customers by pipeline. In addition product can be shipped by barge, rail and truck. As a result, we believe that our integrated and strategically located network of facilities and logistics assets in the United States provides us with a significant competitive advantage and would be costly for our competitors to replicate.

We believe that we benefit from industry 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 and new plants can involve more challenges in obtaining the necessary local, regional and state permits. In addition, existing supply chains, including captive pipeline connections and other transportation logistics add to the competitive advantages available to incumbent producers. As a result, we believe that our integrated and strategically located network of facilities and end-to-end logistics assets in the United States provide us with a significant competitive advantage and would be costly for our competitors to replicate. In 2016 we estimate that our refining services product group had a regenerated sulfuric acid supply share in excess of 50% in the United States, which we believe is substantially larger than our closest competitor.

Sulfuric acid is created either through the burning of sulfur in furnaces, or as a by-product of other industrial processes, primarily the smelting of copper and other base metals. We produce a range of virgin sulfuric acid products by burning sulfur in our plants for supply to a diverse set of end uses. Sulfur-burned acid is generally considered to be of higher purity and quality than smelter-produced acid and, as a result, smelter-produced acid is not suitable for some industrial users including several of our larger customers who require higher quality and differentiated sulfuric acid products, such as super-saturated sulfuric acid (oleum) and other high purity specialty acids. Virgin sulfuric acid and regenerated sulfuric acid are manufactured in our regeneration plants using the same production equipment and, in addition, we have one facility in Houston, Texas that produces only virgin sulfuric acid from sulfur.

Sales & Marketing. Our sales and marketing strategy for our environmental catalysts and services business is based on a collaborative approach to working with our customers. We have a proven track record of working closely with customers to develop and manufacture highly technical and customized products for specific uses, which generally requires significant technical support and collaboration. In our catalyst product groups, the sales force and technical experts from our research and development facilities assist with the design and development of new products for a client's specific needs. This type of close working relationship often requires a non-disclosure agreement and joint development agreement and, in some cases, has enabled us to obtain exclusive supply arrangements for the developed product.

Our refining services product group relies on an experienced direct sales force to market our products and services. Our sales force and product stewardship staff remain engaged with our customers from the initial negotiation and implementation of a supply arrangement through the term of such supply arrangement and, in many cases, our sales force and product stewardship staff provide technical assistance to customers for the safe handling and storage of our products. We also rely on established chemical distributors to market and sell our virgin sulfuric acid and aluminum sulfate.

Our refining services product group is an end-to-end business model, taking spent acid from the back end of our customer's production processes and returning cleaned, regenerated sulfuric acid via barge, trucks, rail, and pipeline for reuse by our customers. Spent acid for our refining services is generally supplied to us as part of a long-term supply contract. Pipelines are typically owned by our customers, while rail, road and some barge assets are typically third-party leased, and most barges are generally owned by the company. Managing the logistics involved in this end-to-end business model is a critical part of our refining services.

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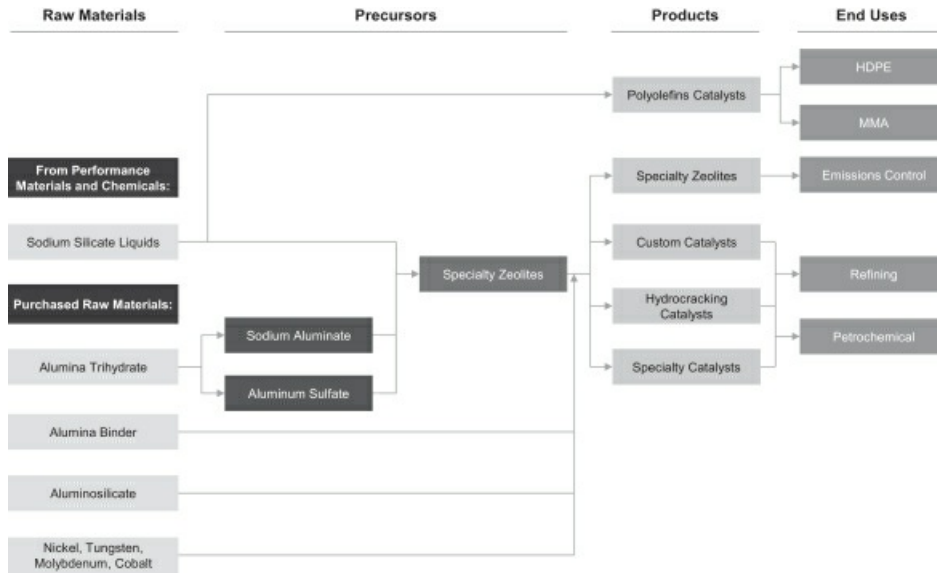
Most of our refining services contracts feature take-or-pay volume protection and/or quarterly price adjustments for commodity inputs, labor, the Chemical Engineering Plant Cost Index or natural gas. In 2016, approximately 94% of our refining services product group pro forma sales were sold under contracts that included some form of raw material pass-through clause. These price adjustments generally reflect our refining services actual cost structure in producing sulfuric acid, and tend to provide us with some protection against volatility in labor, fixed costs and raw material pricing. Freight expenses are generally passed through directly to customers. Excluding contracts with automatic evergreen provisions, approximately 60% of our sulfuric acid volume for the year ended December 31, 2016 was under contracts expiring at the end of 2019 or beyond.

Competition. Our silica catalysts and zeolite catalysts products groups are leading global catalyst platforms that primarily produce catalysts and services for customers in the petrochemicals and refining industries. In these areas we primarily compete with other global producers such as W.R. Grace, BASF, UOP, and Albemarle, as well as other niche competitors such as Tosoh, Axens, and Haldor Topsoe, and we typically compete on the basis of performance, product consistency, reliability, and responsiveness to changes in customer demand.

Refining services is a regional business due to shipping costs and customer integration requirements, and therefore our network of facilities is concentrated in the major areas of growth in sulfuric acid demand in the United States. These plants are located close to our major refining services customers and are typically integrated through well-established supply chain networks, including in some cases captive pipelines connecting us to our refining services customers. We compete in the North American refining services industry with competitors such as Chemtrade and Veolia and we compete on the basis of price, reliability, and responsiveness to changes in customer demand, which is a function of scale, proximity to customer locations and operational expertise. We estimate that our refining services product group holds the number one supply share position in the United States in sulfuric acid regeneration based on 2016 sales volume with an estimated 53% supply share. We also estimate that we had a 64% supply share in each of the West Coast and Gulf Coast regions based on 2016 sales volume, which we believe was greater than three times the supply share of our largest competitor.

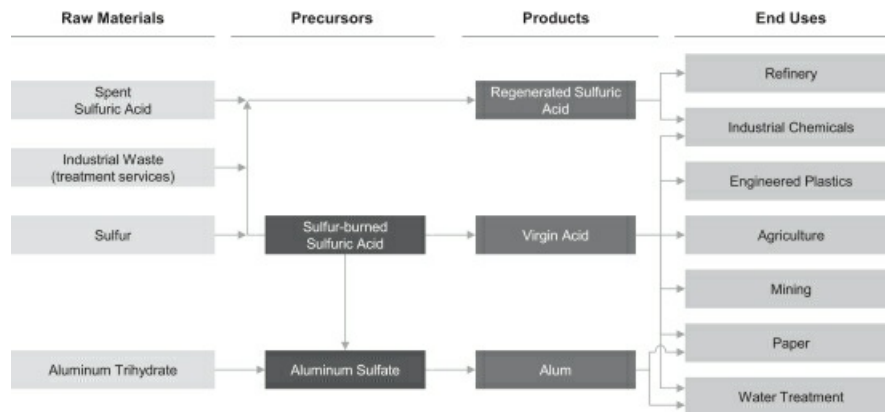
Manufacturing. We manufacture our zeolyst-based catalyst products using sodium silicates liquids from our performance chemicals product group to make specialty zeolite products, which are either used directly to produce catalysts or are sold as a precursor to other catalyst manufacturers.

Catalyst Manufacturing Platform



We produce regenerated sulfuric acid and virgin sulfuric acid through our furnace operations. Regenerated sulfuric acid is produced by breaking down the spent acid in our furnace into the usable components of sulfuric acid and water. Virgin sulfuric acid is produced by burning sulfur and certain sulfur-rich components at high temperatures within a furnace. The chart below summarizes the manufacturing platform for our refining services product group.

Refining Services Manufacturing Platform



Performance Materials & Chemicals

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. We believe that our global footprint enables us to compete more effectively on a global basis due to the costs associated with shipping these products over extended distances. We believe that our network of strategically located manufacturing facilities allows us to serve our customers at a lower cost than our competitors and with quicker delivery times for our products. Our performance materials are also used in some cases as a substitute for less environmentally friendly materials. For example, specialty silicates are displacing phosphates in dish detergents, precipitated silicas are displacing carbon black in tires, and hollow and solid microspheres are displacing plastic volumes in transportation lightweighting applications. Our performance materials and chemicals business consists of two product groups: performance chemicals and performance materials.

Performance Chemicals. Our performance chemicals product group includes silicate products and derivatives, which are used in a variety of applications such as adsorbents for surface coatings, clarifying agents for edible oils and beverages, precursors for green tires, and additives for cleaning and personal care products. Silicates are a family of products manufactured primarily from readily available materials, such as industrial sand and soda ash. These raw materials are typically fused in a furnace and then dissolved in water under pressure to form water-soluble silicates for use in our downstream products, such as precipitated silica and silica gels. We sell our performance chemicals products to customers who use silicates as precursors, such as sodium silicates that are used in the growing precipitated silica end uses, as well as for downstream derivative products, such as silicas used as additives in toothpaste formulation and silica gels that are used as adsorbents in food and beverage manufacturing.

Our performance chemicals product group, which is the backbone across our additives and catalyst platform, is highly regionalized because of the expense of shipping sodium silicates extended distances due to their water content. As a result, our network of regional silicate plants is strategically located to support the customers that we serve. In addition, we maintain a few larger dedicated facilities to service our derivative products. Our performance chemicals product technology requires significant know-how and scale in order to be able to operate in a cost effective manner. We believe that we are the only global silicates producer who can supply all of the major regions and we estimate that we have three times the sodium silicates supply share as our nearest competitor based on 2016 sales volume. Key end uses for our performance chemicals products include catalyst precursors, food and beverage, personal care, cleaning products, coatings, tires, soil stabilization, paper de-inking, and sequestration.

Silicates. Silicates and their family of derivatives, such as silicas, have functional attributes that are used as additives and ingredients to enhance product performance as binders, fillers, flow control agents, and carriers in our customers’ products. Our silicates are used in a diverse range of applications. In detergents and cleaning products, silicates provide corrosion inhibition, alkalinity, emulsification, and deflocculation. In construction materials such as roofing granules, cement, ceramics, adhesives, and coatings, our products are used as a binding agent. In addition, our products are ingredients in the consumer products, which includes personal care and consumer cleaning products, where customers are seeking more environmentally friendly products without loss of effectiveness or performance. We believe that our products have the environmental and safety profile to address these evolving customer demands. Silicates and silicate derivatives are recognized on the Safer Chemicals Ingredients List of the EPA’s Safer Choice program, which we believe positively impacts our ability to compete in the consumer products applications.

Silica Derivatives. Silica derivatives include specialty silicas, zeolite products, spray dry silicates, magnesium silicate, and other specialty chemicals. Silica derivatives are used in personal care products as a

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binder in pharmaceutical products, and as a source of alkaline in cleaning products, such as industrial cleaners. In addition, our silica derivatives are used in natural resources applications such as in drilling fluids as a lubricant binder. Some of our silicas and zeolites are used by our environmental catalysts and services business to produce catalysts and catalyst precursors. We believe that this internal source of supply is a competitive advantage both for our performance chemicals product group, which can take advantage of opportunities to maximize the use of our sodium silicates production capacity and for our silica catalysts and zeolite catalysts product groups, which are able to access a consistent quality source of precursors.

Silica Gels. Silica gels are used as drying agents or adsorbents and desiccants for food and industrial products. For example, silica gels are used in the brewing industry to remove certain compounds that cause chilled beer to look cloudy, and are used as clarification agents for wines and fruit juices, and as an adsorbent of free fatty acid and other contaminants in the refining of cooking oils. In personal care, silica gels are used as carriers for vitamins and pharmaceuticals, and as a flow conditioner and an oil absorption agent in face powders. In industrial and engineered plastics, silica gels are used for gloss control in coil, wood, general industrial, leather and other high-performance surface coatings applications. In addition, highly-porous specialty silica gels are used in ink-receptive coatings for inkjet media. Some recently developed silica-based products are designed for ultraviolet-cured coatings and other low solvent formulations that offer more environmentally friendly characteristics. Silica gels are also used to create coatings that have significant capacity to absorb ink in order to allow for quick setting of colorants and faster ink dry times, which can improve color density and reduce ink bleed.

Precipitated Silicas. Precipitated silicas represent the largest volume of specialty silicate products based on 2016 sales volume, but are also concentrated among a limited number of suppliers. Precipitated silica applications include filler in rubber for green tire applications and gel dentifrice formulations used in toothpaste as an abrasive or thickener. Precipitated silicas are an alternative to calcium phosphates because of their compatibility with different fluorides and their softness. In addition, precipitated silicas are used as functional filler in polyethylene membranes for lead-acid batteries, which are used in most automobiles. In agricultural end uses, precipitated silicas are used as carriers for liquid ingredients in dry animal feeds and as a flow aid and dispersant in insecticide formulations for crop care. We continue to collaborate with our customers to innovate in this industry. For example, we recently worked with certain customers to deliver new products for whitening and desensitizing toothpaste applications that offer improved cleaning performance with low abrasion.

Zeolites. We produce zeolites by combining sodium silicate with aluminum trihydrate and other materials. These products are used as adsorbents and detergents. We also use these products to serve newer applications such as stabilizers in the production of polyvinylchloride, a titanium dioxide replacement for paints and coatings, and coatings applications for food grade paper.

Other Specialty Silicates. Other specialty silicates that we produce are used for a variety of industrial, personal care, and cleaning products. End uses include refractory, cleaning products, oil processing, hair bleach, fire retardants, water treatment, and adhesives. Our specialty silicate products are also used in drilling fluids for oil and gas wells to maintain drill hole integrity.

Performance Materials. Our performance materials product group includes specialty glass products, such as highly engineered microspheres made from either recycled glass or fresh batch material using our proprietary furnace operations. We believe that we are an industry leader in North America, Europe, South America, and Asia (excluding China) in microspheres. These products are used in the reflective markings used on roads and runways to enhance visibility at night and in poor weather to improve safety. Our microspheres, which can be solid or hollow, are also used as additives in plastics for lightweighting and in abrasive media, where they are used to clean,peen and debur metal surfaces, such as for turbine blades used in aerospace and power generation industries.

In the highway safety applications, our microspheres are used with a variety of binders, such as water- and solvent-borne paint, epoxy coatings, and thermoplastics. Our microspheres are mixed in with, or dropped into,

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these binders as pavement markings are being applied. These microspheres remain partly exposed after the markings dry and provide retroreflectivity that increases the visibility of the road markings at night and during inclement weather. We sell these microspheres primarily to federal and state government agencies, municipalities, highway contractors, binder manufacturers and airport agencies. Demand for our performance materials products has grown as a result of increased spending for maintenance and upgrading of existing roads and the construction of new roads around the world. Demand for our highway safety products is principally driven by replacement demand and new road construction and, as such, demand for these products has grown through economic cycles without exhibiting as pronounced cyclicality as other end uses. Highway safety budgets in the United States are typically funded by taxes on gasoline and are not typically tied to economic cycles or to the state and local government budgeting process. The United States federal government has taken an active role in implementing regulations and initiating infrastructure development in an effort to improve highway safety. In addition, the continuing need to maintain and upgrade an aging United States highway infrastructure, has translated into relatively consistent government expenditure in this area. The most recent innovation from our performance materials product group is our ThermoDrop product, which simplifies the road striping operations for our customers by using a new durable thermal plastic road marking material. We have also introduced a new faster-drying road marking system, Visilok, which can reduce traffic disruption during striping operations and improve road worker safety by reducing the amount of time needed to complete the road marking process.

We also sell highly specialized solid and hollow microspheres and metal coated particles for a variety of uses such as plastic additives, conductive applications, metal finishing, and other industrial and consumer applications. For metal finishing, our performance materials are propelled from blasting equipment to clean, peen, debur, and finish metal in industrial and process chemical end uses. Our performance material products offer the ability to design lighter parts while maintaining strength and reliability. Our performance materials are often a preferred substitute for other media such as industrial sand, aluminum oxide, iron and steel because they do not damage parts and they allow for better process control, limit surface contamination, and can be more environmentally friendly.

Other applications for our microspheres include additives into paints and coatings for thermal insulation, to reduce weight and ingredients in cosmetics to improve feel attributes and improve flow functionality. Our microspheres are also used in drilling fluids to provide lubrication and strength. Within the natural resources industry, our performance materials are used in oil-drilling muds to improve lubricity and reduce friction in horizontal drilling. In addition, our hollow microspheres are used as sensitizers for water-based industrial explosives in mining, quarrying, and construction. Sensitizers are also used in explosives to increase the energy of a detonation.

We believe that our industry leadership position, scale, and industry presence provides us with a competitive advantage over competitors who compete only in particular end uses. We believe that it would be costly and difficult for a new entrant or existing competitor to replicate our breadth or economies of scale in the production of microspheres.

Sales & Marketing. Our performance chemicals product group relies on a direct sales force to market our broad array of products. For most customers, our direct sales force calls on the customer, supported by our experienced technical staff. Our global sales force and technical staff employ a proactive and collaborative approach to the sales process. In many cases, particularly in our specialty products, our sales force assists our research and development team with the design and development of new products to meet a customer's specific needs. Our performance materials product group uses a technically-trained internal sales force to market our product offerings in the different geographies that we serve. We sell highway safety products directly to road striping contractors, binder manufacturers and original equipment manufacturers through regional sales managers in North America, Europe and Asia. We also sell these products directly to states and municipalities through a bidding process that is handled by our corporate staff. Our performance materials products outside of highway safety are sold through a direct sales force and a network of distributors. In addition to our direct sales force, we use chemical distributors to market and sell a smaller portion of our performance materials and chemicals products to smaller customers.

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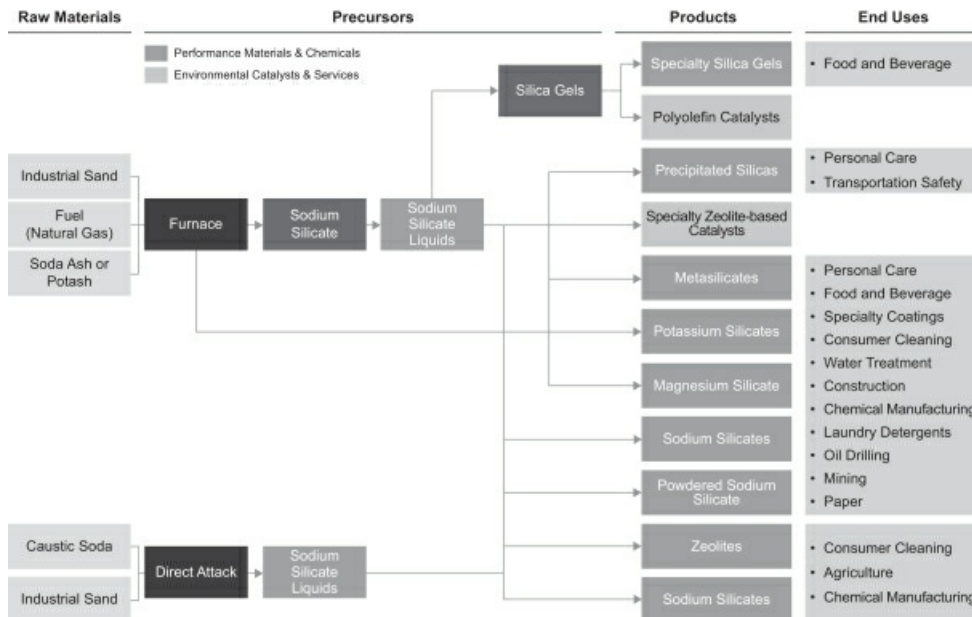
For the year ended December 31, 2016, approximately 45% of our North American silicate pro forma sales, which represented a significant portion of our performance chemicals product group sales, were derived from contracts that included raw material pass-through clauses. Under these contracts, there is usually a time lag of between three and nine months for price changes to pass-through, depending on the magnitude of the change, industry dynamics and the terms of the particular contract.

Competition. In our performance materials and chemicals business, we primarily compete with other global producers such as OxyChem, PPG and Evonik. We believe that we are the only global silicates producer with operations in North America, Europe, and Australia, and we believe that we have technical and cost advantages in all of these regions as compared to our competitors as a result of the scale and breadth of our product offerings and operations. We compete primarily on a regional basis due to the costs associated with shipping sodium silicates, and we estimate that we had approximately three times the sodium silicate supply share of our nearest competitor based on 2016 sales volume. Our network of regional silicate plants is strategically located to support the industries that we serve. In addition, we maintain a few larger dedicated facilities to service our derivative products. We believe that our network of strategically located manufacturing facilities allows us to serve our customers at a lower cost than our competitors and with quicker delivery times for our products. In the industry served by our performance materials and chemicals business, we compete primarily on the basis of performance, product consistency, quality, reliability, and ability to innovate in response to customer demands. Our competitors are primarily regional suppliers.

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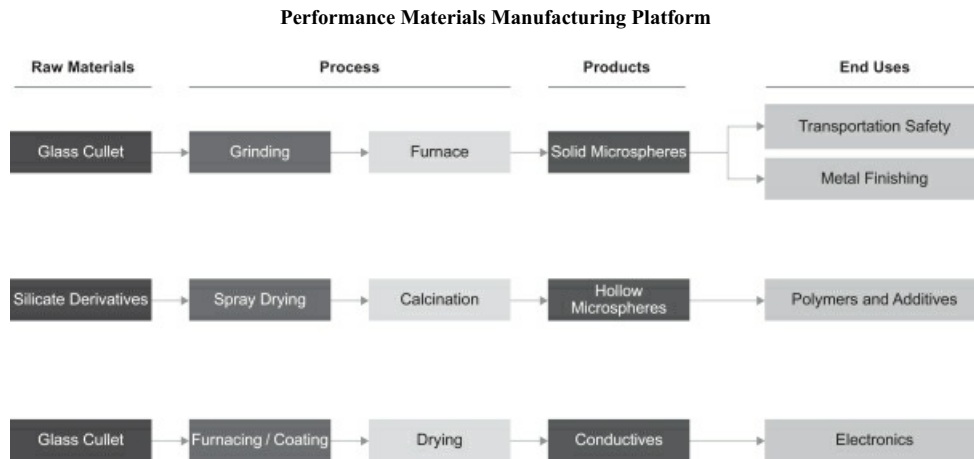
Manufacturing. Performance chemicals are produced through an integrated supply chain beginning with regional and large scale upstream production of sodium silicates and downstream derivatives. Sodium silicates are produced regionally because of the expense of shipping sodium silicates extended distances due to their water content. Our sodium silicates are produced by fusing industrial sand and soda ash in our proprietary furnace operations. We dissolve the molten silicate from the furnace into water and sell these products in liquid form. Downstream derivatives are produced through a variety of chemical operations that create aqueous, solid, and gel forms for our products.

Performance Chemicals Manufacturing Platform



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We produce our highway safety products and other microspheres by crushing raw materials, such as recycled glass or cullet, and then feeding these raw materials into a furnace. The product is coated or treated in other ways to meet particular customer and end use specifications. The beads are then bagged and stocked for shipment. The flowchart below outlines our performance materials' production process.



Properties

Our operating headquarters are located in Malvern, Pennsylvania. As of June 30, 2017, we had 72 manufacturing facilities in 19 countries on six continents. We also had 14 administrative facilities and six research and development facilities located in 12 countries. Our joint ventures operated out of seven facilities located in six countries, including six manufacturing facilities. We also own or lease other properties, including office buildings, warehouses, testing facilities and sales offices.

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The table below presents summary information regarding our principal facilities as of June 30, 2017.

Location	Approximate Square Feet	Owned or leased	PM&C	EC&S
<i>Administrative facilities:</i>				
Amersfoort, Netherlands	7,481	Leased	X	
Lenexa, Kansas, United States	14,489	Leased	X	
Malvern, Pennsylvania, United States	33,000	Leased	X	X
<i>Research and development facilities:</i>				
Toronto, Canada	2,500	Leased	X	
St. Pourcain-sur-Sioule, France	30,916	Owned	X	
Eijsden, Netherlands	4,306	Owned	X	
Warrington, United Kingdom	14,155	Owned	X	X
Conshohocken, Pennsylvania, United States	74,968	Owned	X	X
<i>Manufacturing facilities:</i>				
Melbourne-Dandenong, Australia	48,378	Owned	X	
Jacana, Brazil	43,753	Owned	X	
Rio Claro, Brazil	193,750	Owned	X	X
Toronto, Canada	75,471	Owned	X	
Valleyfield, Canada	46,000	Owned	X	
Lamotte, France	130,567	Leased	X	
Wurzen, Germany	124,915	Owned	X	
Pasuruan, Indonesia	68,489	Owned	X	X
Guadalajara, Mexico	105,866	Owned	X	
Tlalnepantla, Mexico	136,209	Owned	X	
Eijsden, Netherlands	161,544	Owned/Leased ⁽¹⁾	X	
Maastricht, Netherlands	70,073	Leased	X	
Winschoten, Netherlands	134,548	Leased	X	
Delfzijl, Netherlands	38,373	Leased ⁽²⁾		X
Bangkok, Thailand	12,056	Owned	X	
Warrington, United Kingdom	371,063	Owned	X	X
Augusta, Georgia, United States (Plant 102/104)	65,178	Owned	X	
Augusta, Georgia, United States (Plant 500)	121,502	Leased	X	
Baltimore, Maryland, United States	19,852	Owned	X	
Baton Rouge, Louisiana, United States	13,503,600	Owned		X
Baytown, Texas, United States	348,480	Owned		X
Brownwood, Texas, United States	107,900	Owned	X	
Chester, Pennsylvania, United States	172,707	Owned	X	
Dominguez, California, United States	1,437,480	Owned		X
Gurnee, Illinois, United States	96,000	Owned	X	
Jeffersonville, Indiana, United States	29,052	Owned	X	
Joliet, Illinois, United States	168,657	Owned	X	
Hammond, Indiana, United States	1,132,560	Owned		X
Houston, Texas, United States	2,003,760	Owned		X
Kansas City, Kansas, United States	220,679	Owned ⁽³⁾		X
Martinez, California, United States	5,096,520	Owned		X
Muscatine, Iowa, United States	105,072	Owned	X	
Rahway, New Jersey, United States	124,035	Owned	X	
Paris, Texas, United States	147,158	Owned	X	
Pineville, Louisiana, United States	14,522	Owned	X	
Portland, Oregon, United States	1,176,120	Owned		X
Potsdam, New York, United States	88,798	Owned	X	
South Gate, California, United States	71,632	Owned	X	
St. Louis, Missouri, United States	44,034	Owned	X	

(1) Approximately 89,911 square feet is owned and approximately 75,939 square feet is leased.

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- (2) The facility is used by our Zeolyst Joint Venture under a ground lease that we entered into with a third party.
- (3) We lease a portion of the site to our Zeolyst Joint Venture.

Financial Information about Geographic Areas

For certain geographical financial information about our business, please see Note 12 to the audited consolidated financial statements of PQ Group Holdings Inc. and subsidiaries included elsewhere in this prospectus.

Raw Materials

We are able to negotiate our supply agreements for our key raw materials based on our leading industry position and global scale in an effort to achieve competitive pricing. We also maintain a raw material quality audit and qualification program to ensure that the material we purchase satisfies stringent quality requirements. The key raw materials for our silica catalysts and zeolite catalysts product groups are sodium silicates, acids, bases and certain metals. The key raw materials used in our refining services product group include spent sulfuric acid and sulfur, both of which have generally been widely available in the geographies in which we operate. The key raw materials used in our performance chemicals product group include soda ash, industrial sand, aluminum trihydrate and sodium hydroxide. The key raw materials used in our performance materials product group include cullet, which is glass sourced from glass recyclers around the world. Cullet has generally been available in sufficient supply from local recyclers in the regions in which we operate.

While natural gas is not a direct feedstock for any individual product, we use natural gas powered furnaces to heat raw materials and create the chemical reactions necessary to manufacture our products. We maintain multiple suppliers wherever possible and we seek to hedge our exposure to fluctuations in prices for natural gas through hedging activity in the United States, forward purchases of natural gas in the United States, Canada, and Europe, and the use of pass-through clauses for raw material and natural gas costs in our customer contracts. However, we may not be successful in passing through all increases in raw material costs or maintaining an uninterrupted supply of natural gas for all of our furnaces. See “Risk Factors—Risks Related to Our Business—If we are unable to pass on increases in raw material prices, including natural gas, to our customers or to retain or replace our key suppliers, our results of operations and cash flows may be negatively affected.”

Research and Development

We benefit from the highly-skilled technical capabilities of our employees dedicated to new product development. We operate six research and development facilities in the United States, Canada, the United Kingdom, the Netherlands and France. Our research and development activities are directed toward the development of new and improved products, processes, systems and applications for customers. Our research and development team is organized to support each of our operating businesses and staffed with experienced scientists, technical service representatives and process engineers with direct knowledge of our products. This business group and customer-oriented team structure provides strong links between our product development and manufacturing functions and our customer collaboration and specifications. These connections enable us to focus our development on timely and relevant products for our customers while remaining attentive to manufacturing considerations to enable us to produce new products profitably and in a timely manner. Product development activities are organized into research and development projects that are subject to regular reviews by the business teams in order to understand and address our customers’ evolving needs and invest in our growth by prioritizing innovation driven by these identified needs. In addition, we are improving the way our research and development team shares information by removing silos and holding regular senior-level project reviews to ensure best practices are shared and consistent metrics are used to determine a project’s merit and the size of the potential opportunity. Pro forma company-sponsored research and development expenses were approximately \$10.8 million for the year ended December 31, 2016 and \$10.3 million for the year ended December 31, 2015. Legacy Eco did not incur research and development expenses for the year ended December 31, 2014. Legacy PQ

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company-sponsored research and development expenses totaled \$9.1 million for such period. Such totals do not include the research and development expenses incurred by our Zeolyst Joint Venture, which totaled \$16.0 million, \$14.0 million and \$12.9 million for the years ended December 31, 2016, 2015 and 2014, respectively.

Our Joint Ventures

We have entered into several long-standing joint ventures to supplement our businesses and access other geographic locations, minimize costs and accelerate growth in areas we believe have significant business potential, including:

Zeolyst Joint Venture. Our Zeolyst Joint Venture is a long-standing partnership with CRI, that dates back to 1988 and is focused on the development, manufacture and sale of zeolite-containing catalysts through manufacturing facilities located in Kansas and The Netherlands. We have a 50% ownership stake in our Zeolyst Joint Venture.

PQ Holdings Mexicana S.A. de C.V. PQ Holdings Mexicana was established in 2000 as a joint venture with Solvay Alkalis, Inc. for the manufacture, marketing and sale of various chemicals, including sodium silicate and metasilicate, through manufacturing facilities in Tlalnepantla and Guadalajara, Mexico. We have an 80% ownership stake in PQ Holdings Mexicana.

Potters (Thailand) Limited. Potters (Thailand) Limited was established in 1988 as a joint venture with Mr. Sompong Dowpiset for the manufacture of high-quality microspheres for industrial and highway safety applications through a manufacturing facility in Bangkok, Thailand. We have an approximate 75% ownership stake in Potters (Thailand) Limited.

Quaker Chemicals South Africa Pty Ltd Quaker Chemicals South Africa was established in 1986 as a joint venture with the Quaker Chemical Corporation (“Quaker”) for the distribution and sale of specialty chemicals utilizing Quaker’s trademarks and incorporating Quaker’s formula and technical data through a manufacturing facility in Jacobs, South Africa. We have a 49% ownership stake in Quaker Chemicals South Africa.

PQ Silicates Limited. PQ Silicates was established in 1997 as a Taiwan joint venture with Mr. James Fang for the import and sale of sodium and potassium silicate. We have a 50% ownership stake in PQ Silicates.

Customers

We collaborate with multinational companies who often seek global solutions. Our customers include large industrial companies such as BASF, Honeywell and 3M and global catalyst producers such as Albemarle and W.R. Grace. We also supply catalysts to leading chemical and petrochemical producers such as BASF, Dow Chemical, Lucite, LyondellBassell and Shell. We supply personal care ingredients and additives to leading consumer products companies such as Unilever and Colgate-Palmolive. We have long-term relationships with our top ten customers, based on 2016 pro forma sales, that average more than 50 years. In addition, our customer base is diversified, with our top ten customers in 2016 representing approximately 24% of pro forma sales for the year ended December 31, 2016 and no customer representing more than 4% of our pro forma sales during such period.

Intellectual Property

We evaluate on a case-by-case basis how best to use patents, trademarks, copyrights, trade secrets and other available intellectual property protections in order to protect our products and our critical investments in research and development, manufacturing and marketing. We focus on securing and maintaining patents for certain inventions such as composition-of-matter, while maintaining other inventions such as process improvements as

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trade secrets, derived from our market-based business model, in an effort to maximize the value of our product portfolio and manufacturing capabilities and reinforce our competitive advantage. Our policy is to seek appropriate intellectual property protection for significant product and process developments in the major areas where the relevant products are manufactured or sold. Patents may cover products, processes, intermediate products and product uses. Patents extend for varying periods in accordance with the date of patent application filing and the legal life of patents in the various countries in which the patents are registered. The protection afforded, which may also vary from country to country, depends upon the type of subject matter covered by the patent and the scope of the claims of the patent.

In most industrial countries, patent protection may be available for new substances and formulations, as well as for unique applications and production processes. However, given the geographical scope of our business and our continued growth strategy, there are regions of the world in which we do business or may do business in the future where intellectual property protection may be limited and difficult to enforce. Moreover, we monitor our competitors' products and, if circumstances were to dictate that we do so, we would vigorously challenge the actions of others that conflict with our patents, trademarks and other intellectual property rights. We maintain appropriate information security policies and procedures reasonably designed to ensure the safeguarding of confidential information including, where appropriate, data encryption, access controls and employee awareness training.

We own or have rights to a number of patents relating to our products and processes. As of June 30, 2017, we owned 47 patented inventions in the United States, with approximately 300 patents issued in countries around the world and approximately 140 patent applications pending worldwide covering more than 25 additional inventions. As of June 30, 2017, we also had trademark rights in approximately 600 trademark registrations worldwide, including approximately 75 U.S. trademark registrations. We also have approximately 75 pending trademark applications, which include applications in the United States and worldwide. In addition to our registered and applied-for intellectual property portfolio, we also claim ownership of certain trade secrets and proprietary know-how developed by and used in our business. Including our joint ventures, we are party to certain arrangements whereby we license in the right to use certain intellectual property rights in connection with our business.

Employees

As of December 31, 2016, we had 2,949 employees worldwide, of which 1,394 were employed in the United States, 423 were employed in Canada, Mexico and Brazil, 833 were employed throughout Europe, 33 were employed in South Africa and 93 were employed in Indonesia. Our remaining employees are dispersed throughout Asia and Australia, primarily in Australia, China, Thailand and Japan. As of December 31, 2016, approximately 49% of our employees were represented by a union, works council or other employee representative body. We believe we have good relationships with our employees and their respective works councils, unions or other bargaining representatives. There have been no labor strikes or work stoppages in these locations in recent history.

Environmental Regulations

Obtaining, producing and distributing many of our products involve the use, storage, transportation and disposal of toxic and hazardous materials. We are subject to extensive, evolving and increasingly stringent national and local environmental laws and regulations, which address, among other things, the following:

- emissions to the air;
- discharges to soils and surface and subsurface waters;
- other releases into the environment;
- prevention, remediation or abatement of releases of hazardous materials into the indoor or outdoor environment;

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- generation, handling, storage, transportation, treatment and disposal of waste materials;
- maintenance of safe conditions in the workplace;
- registration and evaluation of chemicals;
- production, handling, labeling or use of chemicals used or produced by us; and
- stewardship of products after manufacture.

We apply the principles of the Environmental Management standard of the International Organization for Standardization (ISO 14001) at our facilities throughout the world. For chemical facilities in the United States, we also adhere to the Responsible Care RC14001 Technical Specifications of the American Chemistry Council.

We maintain policies and procedures to monitor and control environmental, health and safety risks, and to monitor compliance with applicable state, national, and international environmental, health and safety requirements. We have a strong environmental, health and safety organization. We have a staff of professionals who are responsible for environmental health, safety and product regulatory compliance. We have implemented a corporate audit program for all of our facilities. However, we cannot provide assurance that we will at all times be in full compliance with all applicable environmental laws and regulations. We expect that stringent environmental regulations will continue to be imposed on us and our industry in general. Evolving chemical regulation programs throughout the world could impose testing requirements or restrictions on our chemical raw materials and products. These programs include the 2016 amendments to the U.S. Toxic Substances Control Act, under which the EPA will prioritize and evaluate chemicals for regulation, the E.U. REACH regulations, which have ongoing registration and evaluation requirements with associated testing costs and potential restrictions, the Korea REACH law, which is requiring registration and potentially testing of chemicals, and similar programs being developed in Taiwan, Turkey, India, and elsewhere. Given knowledge of our chemicals and the various regulations promulgated to date, we do not anticipate costly testing requirements or severe restrictions, but cannot guarantee that we will be free of requirements for our products or raw materials that could materially affect our operations.

Environmental Remediation. Environmental laws and regulations require mitigation or remediation of the effects of the disposal or release of chemical substances. Under some of these regulations, as the current or former owner or operator of a property, we could be held liable for the costs of removal or remediation of hazardous substances on or under the property, without regard to whether we knew of or caused the contamination, and regardless of whether the practices that resulted in the contamination were permitted at the time they occurred. Many of our current or former production sites have an extended history of industrial use, and it is impossible to predict precisely what effect these laws and regulations will have on us in the future. Soil and groundwater contamination requiring investigation and remediation has been discovered at some of the sites, and might occur or be discovered at other sites. Several active and former facilities currently are undergoing investigation and remediation, including sites in Rahway, NJ; Dominguez, CA; Martinez, CA; and Tacoma, WA.

Environmental Programs. We have comprehensive environmental, health and safety compliance, auditing and management programs in place to assist in our compliance with applicable regulatory requirements and with internal policies and procedures, as appropriate. Each facility has developed and implemented specific critical occupational health, safety, environmental, security and loss control programs.

We also have implemented a Health, Safety and Environmental (“HSE”) organizational structure with executive committee level leadership and dedicated environmental experts. We have Regional HSE Specialists and Managers who are embedded in the field and provide HSE expertise and support to operating sites. Certain, larger sites may have dedicated environmental or safety personnel. We have an established Product Safety/Stewardship management system compliant with the RC14001 technical specification along with two Product Stewardship Managers, one of which is a REACH Specialist. We conduct Product Stewardship reviews as part of new product development and routinely evaluate product safety risk for raw materials, intermediates and products.

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Chemical Product Regulation

As a chemical company, we are subject to extensive and evolving regulations regarding the manufacture, processing, distribution, import, export, and labeling of our products and their raw materials. In the European Union, the REACH regulations went into effect in 2007 with implementation rolling out over time. REACH requires registration of chemicals, along with a dossier of toxicological and ecotoxicity test results, or a plan to conduct such tests if currently unavailable. Registered chemicals then can be subject to further evaluation and potential restrictions. Our high-volume chemicals have been registered under REACH; up to 15 lower-volume chemicals (mainly catalysts) will be registered by the 2018 deadline. To date, no testing has been required. A couple of our chemicals are being reviewed under REACH. Since the promulgation of REACH, other countries (e.g., China, Korea, Taiwan) have enacted and are in the process of implementing similar comprehensive regulation of chemicals. In the United States, legislation has been enacted that would require the EPA to review and require testing of certain chemicals. Given knowledge of our chemicals and the various regulations promulgated to date, we do not anticipate costly testing requirements or severe restrictions, but cannot guarantee that we will be free of requirements for our products or raw materials that could materially affect our operations. In particular, some of our products might be characterized as nanomaterials and then subjected to evolving new nanomaterial regulations.

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.

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MANAGEMENT

Executive Officers and Directors

Below is a list of the names, ages as of June 30, 2017, and positions, and a brief account of the business experience, of the individuals who serve as our executive officers and directors as of the date of this prospectus. Our certificate of incorporation will provide that our board of directors will be divided into three classes of directors, with the classes as nearly equal in number as possible. As a result, approximately one-third of our board of directors will be elected each year. Upon completion of this offering, we expect that each of our directors identified below will serve in the class indicated. Subject to any earlier resignation or removal in accordance with the terms of our certificate of incorporation and by-laws, our Class I directors will serve until the first annual meeting of stockholders following the completion of this offering; our Class II directors will serve until the second annual meeting of stockholders following the completion of this offering; and our Class III directors will serve until the third annual meeting of stockholders following the completion of this offering.

<u>Name</u>	<u>Age</u>	<u>Position</u>
James F. Gentilcore	65	Chief Executive Officer, President and Director (Class I director)
Michael Crews	50	Executive Vice President and Chief Financial Officer
Scott Randolph	55	Executive Vice President and Group President—Performance Materials and Chemicals
Paul Ferrall	60	Executive Vice President and Group President—Environmental Catalysts and Services
John Lau	63	Chief Technology Officer
Joseph S. Kosciński	52	Secretary, Vice President & General Counsel
William J. Sichko, Jr.	63	Chief Administrative Officer, Assistant Secretary and Vice President
David Taylor	61	Senior Vice President—Strategic Development
Michael Boyce	69	Chairman of the Board of Directors (Class II director)
Greg Brenneman	55	Director (Class III director)
Timothy Walsh	54	Director (Class III director)
Christopher Behrens	56	Director (Class III director)
Mark McFadden	39	Director (Class III director)
Robert Toth	56	Director (Class III director)
Robert Coxon	69	Director (Class III director)
Andrew Currie	61	Director (Class III director)
Jonny Ginns	43	Director (Class III director)
Kyle Vann	69	Director (Class III director)
Martin S. Craighead	57	Director (Class III director)
Kimberly Ross	52	Director (Class III director)

James F. Gentilcore became a director and our President and Chief Executive Officer in July 2016. Mr. Gentilcore most recently served as an Executive Advisor to CCMP from April 2014 to June 2016. He previously served as Chief Executive Officer of Edwards Group Limited, a developer and manufacturer of vacuum products, abatement systems and related services, from March 2013 to January 2014, and as a director from December 2007 until January 2014. Prior to that, he was the Chief Executive Officer of EPAC

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Technologies Inc., a logistics technology solutions company, from January 2009 until March 2011. Mr. Gentilcore also served as Chief Operating Officer of Brooks Automation Inc., a position he held from November 2005 until November 2007, after leading the merger between Brooks and Helix Technology Corp., where he had been the Chief Executive Officer from December 2002 until October 2005. Prior to that, Mr. Gentilcore was the Chief Operating Officer of Advanced Energy Industries, Inc. Earlier in his career, he spent 10 years in the electronics materials industry with Air Products Inc., serving in various business development and operational roles. Mr. Gentilcore currently serves on the board of directors of Entegris, Inc. and Milacron Holdings Corp. and previously served as a member of the board of directors of KMG Chemicals Inc. from May 2014 to December 2016. Mr. Gentilcore was elected to serve as a member of our board of directors due to his more than 20 years of management experience and leadership of the company as our President and Chief Executive Officer.

Michael Crews became our Executive Vice President and Chief Financial Officer in August 2015. From 2008 to 2015, Mr. Crews was Executive Vice President and Chief Financial Officer at Peabody Energy, a private-sector coal company. From 1998 to 2008, Mr. Crews held various management positions at Peabody Energy including Vice President—Operations Planning, Assistant Treasurer and Director—Financial and Capital Planning. Mr. Crews began his career in KPMG’s audit function.

Scott Randolph became Executive Vice President and Group President—Performance Materials and Chemicals in December 2016. From March 2016 to December 2016, Mr. Randolph served as Vice President and President—Global Performance Chemicals after previously serving as Vice President and President—Performance Chemicals Americas and Australia and Performance Materials. From April 2005 to May 2016, Mr. Randolph served as President of Performance Materials. Mr. Randolph originally joined us as Senior Vice President Strategic Planning in February 2005. From 2000 to 2005, Mr. Randolph held the position of Chief Financial Officer with Peak Investments, LLC. From 1990 to 2000, Mr. Randolph held a number of management positions with Harris Chemical Group and IMC Global following IMC Global’s acquisition of Harris Chemical Group. Mr. Randolph’s last position with IMC Global was General Manager of the Worldwide Boron Business. From 1989 to 1990, Mr. Randolph held management positions with General Chemical. Prior to that, Mr. Randolph served as a nuclear trained naval officer from 1984 to 1989.

Paul Ferrall became Executive Vice President and Group President—Environmental Catalysts and Services in December 2016. Mr. Ferrall joined us in August 2005 as Senior Vice President of Global Plant Operations for the performance chemicals business and served as Vice President and President—Performance Chemicals Americas & Australia from November 2006 to August 2015, prior to transitioning to President of Refining Services in August 2015. Prior to joining us, Mr. Ferrall had been the president of Peak Chemical and Sulfur and, from 1995 to 2000, held several management positions with Harris Chemical Group and IMC Global, including Vice President of its Soda Products business. From 1978 to 1995, Mr. Ferrall held various positions of responsibility in engineering, operations, finance, sales and business management with Allied Chemical.

John Lau became Chief Technology Officer in January 2016. Dr. Lau joined us in July 1996 to lead our Exploratory Research department with the mission to develop new growth opportunities. Dr. Lau was appointed Vice President of Research and Development in 1998 and Vice President of Strategic Planning in 2005. In November 2006, Dr. Lau became Vice President and General Manager of Silica Catalysts and Zeolyst International and, in January 2011, became President of the Catalysts business. Prior to joining us, Dr. Lau held various research and management positions at W.R. Grace & Co. from 1984 to 1996. From 1982 to 1984, Dr. Lau was a research fellow at the University of California, Los Angeles.

Joseph S. Koscinski became Secretary, Vice President and General Counsel in November 2015. From August 1995 to November 2015, Mr. Koscinski was an attorney in the Business Services Group of Babst, Calland, Clements and Zonnir, P.C., a law firm in Pittsburgh, Pennsylvania, where he was named a shareholder in 2003 and where his corporate practice included mergers and acquisitions, real estate matters and commercial contracts. While in private practice, Mr. Koscinski served as outside corporate counsel to PQ Corporation since 2005.

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William J. Sichko, Jr. became Chief Administrative Officer and Vice President in 2005. Mr. Sichko served as our Secretary from 2005 to November 2015, and is currently an Assistant Secretary. From 1998 through 2005, Mr. Sichko was Chief Administrative Officer with Peak Investments, LLC. From 1991 through 1998, he held management positions with Harris Chemical Group and IMC Global following IMC Global's acquisition of Harris Chemical, including serving as Senior Vice President of Human Resources from 1996 to 1998. From 1987 to 1991, Mr. Sichko was a manager with General Chemical.

David Taylor became Senior Vice President—Strategic Development in September 2017. Prior to joining us, Mr. Taylor served in several senior management positions with Air Products and Chemicals, Inc., a global industrial gas and chemicals supplier. From 2014 to 2016, he was Vice President, Energy from Waste and from 2005 to 2014 he was Vice President, Energy Businesses. Mr. Taylor served as Vice President, Large Air Separation Units from 2003 to 2005 and Vice President, Industrial Chemicals Division from 2002 to 2003. Prior to that, Mr. Taylor held several operational and business development roles with Air Products in the industrial gas and energy businesses.

Michael Boyce became the Chairman of our board of directors in 2005. From 2005 to April 2015, Mr. Boyce also served as our Chief Executive Officer. From 1998 to 2004, Mr. Boyce was the Chairman and Chief Executive Officer of Peak Investments, LLC. Prior to April 1998, he was President & Chief Operating Officer of Harris Chemical Group and Chief Executive Officer of Penrice Soda Products Pty. Ltd. in Australia. Before joining Harris Chemical Group, he was with General Chemical, where he spent two years as Vice President and General Manager of its Industrial Chemicals division. Prior to that, he was President of Catalyst Resources, Inc., a subsidiary of Phillips Petroleum Company that manufactures polypropylene and polyethylene polymerization catalysts. From 1983 through 1986, he was Vice President and General Manager of Sylvachem Corporation, a wholly owned subsidiary of SCM Corporation, a company active in specialty chemicals. Earlier in his career, he was with Union Carbide for 12 years, where he held a variety of positions in business management, sales & marketing and manufacturing. Mr. Boyce currently serves on the board of directors of AAR Corp. and Stepan Company. Mr. Boyce was elected to serve as a member of our board of directors due to his experience as our former Chairman and Chief Executive Officer, his insight into global manufacturing, supply and distribution practices and his international business experience.

Greg Brenneman became a director in 2014. Mr. Brenneman is the Executive Chairman of CCMP and is a member of the firm's Investment Committee. Prior to joining CCMP in October 2008, Mr. Brenneman served as the Chief Executive Officer of QCE Holdings LLC ("Quiznos"), a U.S. quick service restaurant chain, from January 2007 until September 2008 and as the President of Quiznos from January 2007 until November 2007. He also served as the Executive Chairman from 2008 to 2009. Prior to joining Quiznos, Mr. Brenneman was the Chairman and Chief Executive Officer of Burger King Corporation from 2004 to 2006. Prior to joining Burger King, Mr. Brenneman was named the President and Chief Executive Officer of PwC Consulting in June 2002. Mr. Brenneman joined Continental Airlines in 1995 as the President and Chief Operating Officer and as a member of its board of directors. In 1994, Mr. Brenneman founded Turnworks, Inc., his personal investment firm that focuses on corporate turnarounds. Prior to founding Turnworks, Mr. Brenneman was a Vice President for Bain and Company. Mr. Brenneman currently serves on the board of directors of Milacron Holdings Corp., The Home Depot, Inc. and Baker Hughes Incorporated. Mr. Brenneman previously served on the board of directors of Automatic Data Processing, Inc., from 2001 until 2014 and Francesca's Holding Corporation from 2010 until 2015. Mr. Brenneman was elected to serve as a member of our board of directors due to his leadership experience, over 20 years of business experience and extensive experience serving as a public company director.

Timothy Walsh became a director in 2014. Mr. Walsh is the President and Chief Executive Officer of CCMP and is a member of the firm's Investment Committee. Mr. Walsh focuses on making investments in the industrial sector. Prior to joining CCMP upon its formation in August 2006, Mr. Walsh was with J.P. Morgan Partners, LLC and its predecessors from 1993 until 2006. Prior to that, Mr. Walsh worked on various industry-focused client teams within The Chase Manhattan Corporation. Mr. Walsh currently serves on the board of directors of Milacron Holdings Corp. and previously served as a member of the board of directors of Generac

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Holdings Inc. from 2006 until 2016. Mr. Walsh was elected to serve as a member of our board of directors due to his knowledge of the industrial sector and his extensive experience in business and finance.

Christopher Behrens became a director in 2014. Mr. Behrens is a Managing Director of CCMP and a member of the firm's Investment Committee. Mr. Behrens focuses on making investments in the energy, industrial and distribution sectors. Prior to joining CCMP upon its formation in August 2006, Mr. Behrens was with J.P. Morgan Partners, LLC and its predecessors from 1994 until 2006. Prior to that, he was a Vice President in the Merchant Banking group of The Chase Manhattan Corporation. Mr. Behrens previously served as a member of the board of directors of Chaparral Energy, Inc. from 2010 until 2017. Mr. Behrens was elected to serve as a member of our board of directors due to his extensive experience in the energy, industrial and distribution sectors.

Mark McFadden became a director in September 2016. Mr. McFadden is a Managing Director of CCMP and focuses on making investments in the industrial sector. Prior to joining CCMP upon its formation in August 2006, Mr. McFadden was with J.P. Morgan Partners, LLC between 2002 and 2006. Prior to that, Mr. McFadden was an investment banking analyst at Credit Suisse First Boston and Bowles Hollowell Conner. Mr. McFadden currently serves on the board of directors of Milacron Holdings Corp. Mr. McFadden was elected to serve as a member of our board of directors due to his extensive experience in the industrial sector and his significant experience in, and knowledge of, corporate finance and strategic development.

Robert Toth became a director in September 2016. Mr. Toth is a Managing Director of CCMP. Prior to joining CCMP in 2016, Mr. Toth served as the Chief Executive Officer and President of Polypore International, Inc., a leading global high technology filtration company specializing in microporous membranes, since 2005, during which time Polypore transitioned from a private to a public company via a successful IPO in 2007 and was ultimately acquired in 2015. Mr. Toth was previously the President and Chief Executive Officer and a member of the board of directors of CP Kelco ApS, a global leader in the specialty hydrocolloids market. Prior to joining CP Kelco in 2001, Mr. Toth spent 19 years at Monsanto Company and Solutia Inc. where he held a variety of managerial and executive roles. Mr. Toth currently serves on the board of directors of Materion Corporation. Mr. Toth previously served on the board of directors of Polypore International, Inc. from 2005 until 2015. Mr. Toth was elected to serve as a member of our board of directors due to his extensive leadership experience and past service as a public company director.

Robert Coxon became a director in 2007. Mr. Coxon was previously a Senior Advisor to The Carlyle Group, assisting buyout teams in Europe, the United States, the Middle East and Asia until 2013. In that role, he advised Carlyle in making and managing investments in the chemicals sector and was based in London. Prior to joining Carlyle, Mr. Coxon was the Senior Vice President of ICI and the Chief Executive Officer of Syntex, a world leading catalyst company. In addition to serving on our board of directors, Mr. Coxon is also the Chairman of the UK Center for Process Innovation, an international research center in printable electronics, bio-processing and low carbon energy. Mr. Coxon previously served on the board of directors of AZ Electronic Materials SA, Jiangsu Sinorgchem Technology Co., Ltd., Ensus Ltd. and Stahl Holdings BV. Mr. Coxon was elected to serve as a member of our board of directors due to his extensive experience in the chemicals sector.

Andrew Currie became a director in 2008. Mr. Currie has been a director of INEOS, since 1999, a partner of INEOS since 2000 and a director of INEOS AG since March 2010 when the ownership of the INEOS business was transferred to Switzerland. He was previously a Managing Director of Laporte Performance Chemicals, having served as a director of the Inspec Group from 1994 until the Laporte acquisition of Inspec in 1998. Mr. Currie spent the first 15 years of his career with BP Chemicals in various technical and business management functions. Mr. Currie was elected to serve as a member of our board of directors due to his experience in the chemicals sector and his significant core business skills, including financial and strategic planning.

Jonny Ginns became a director in 2010. Mr. Ginns joined INEOS in 2006 as the Group General Counsel, having worked as an external lawyer for a number of years before that. He has experience across a wide range of

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fields, including mergers & acquisitions, disposals, joint ventures, litigation, finance and employee benefits, and acts as a director for a number of INEOS entities. Mr. Ginns was elected to serve as a member of our board of directors due to his significant core business skills, including financial and strategic planning.

Kyle Vann became a director in 2014. Mr. Vann is an Executive Advisor to CCMP since October 2012 and has provided consulting services to Entergy Corporation since 2005. He served for 25 years in various senior leadership positions at Koch Industries including as the Chief Executive Officer of Entergy-Koch LP, a joint venture between Koch Industries and Entergy Corporation. Before joining Koch Industries, Mr. Vann worked at Humble Oil and Refining Company (which later became part of Exxon) as a refinery engineer. Mr. Vann currently serves on the board of directors of EnLink Midstream Partners LP and Legacy Reserves LP. Mr. Vann was elected to serve as a member of our board of directors due to his extensive experience in exploration and production, midstream, energy services and trading.

Martin S. Craighead became a director in July 2017. Mr. Craighead served as the Chief Executive Officer of Baker Hughes Incorporated, a supplier of oilfield services, from 2012 to 2017. He has also served as Chairman of the board of directors of Baker Hughes Incorporated from 2013 to 2017 and has been a member of their board of directors since 2011. Mr. Craighead currently serves on the board of directors of Baker Hughes, a GE company, following the combination of Baker Hughes with GE's oil and gas business. He first joined Baker Hughes Incorporated in 1986 and was its Chief Operating Officer from 2009 to 2012 and Group President of drilling and evaluation from 2007 to 2009. He also served as President of INTEQ from 2005 to 2007 and President of Baker Atlas from February 2005 to August 2005. Mr. Craighead was elected to serve as a member of our board of directors due to his industry expertise in the energy sector and extensive management experience.

Kimberly Ross became a director in July 2017. Ms. Ross served as the Senior Vice President and Chief Financial Officer of Baker Hughes Incorporated, a supplier of oilfield services from 2014 to 2017. Prior to joining Baker Hughes Incorporated in October 2014, Ms. Ross served as the Executive Vice President and Chief Financial Officer of Avon Products Incorporated, a manufacturer of beauty products, from 2011 to 2014. Prior to joining Avon Products, Ms. Ross was an Executive Vice President and the Chief Financial Officer of Royal Ahold N.V., a food retailer, from 2007 to 2011 and held various other finance positions with Royal Ahold N.V. from 2001 to 2007. Ms. Ross serves on the board of directors and the audit committee of Chubb Limited. Ms. Ross was elected to serve as a member of our board of directors due to her extensive financial expertise and experience.

Code of Business Conduct and Ethics

We have adopted a Code of Business Conduct and Ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial officer and principal accounting officer or controller, or persons performing similar functions. Following this offering, a current copy of the code will be available on our website.

Board Structure and Committee Composition

Upon consummation of this offering, we will have an audit committee, a compensation committee and a nominating and corporate governance committee with the composition and responsibilities described below. Each committee will operate under a charter that will be approved by our board of directors. The composition of each committee will be effective upon the consummation of this offering. The members of each committee are appointed by the board of directors and serve until their successor is elected and qualified, unless they are earlier removed or resign. In addition, from time to time, special committees may be established under the direction of the board of directors when necessary to address specific issues.

Our board of directors evaluates any relationship of each director with the company and makes an affirmative determination whether or not such director meets the qualification requirements for being an

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independent director under applicable laws and the corporate governance listing standards of the New York Stock Exchange. Our board of directors reviews any transaction or relationship between each non-employee director or any member of his or her immediate family and the company. The purpose of this review is to determine whether there were any such relationships or transactions and, if so, whether they were inconsistent with a determination that the director was independent. As a result of this review, our board of directors has affirmatively determined that each of our directors, other than _____, are independent directors under the governance and listing standards of the New York Stock Exchange.

Audit Committee

The purpose of the audit committee will be set forth in the audit committee charter. The audit committee's primary duties and responsibilities will be to:

- appoint or replace, compensate and oversee the outside auditors, who will report directly to the audit committee, for the purpose of preparing or issuing an audit report or related work or performing other audit, review or attest services for us;
- pre-approve all auditing services and permitted non-audit services (including the fees and terms thereof) to be performed for us by our outside auditors, subject to de minimis exceptions that are approved by the audit committee prior to the completion of the audit;
- review and discuss with management and the outside auditors the annual audited and quarterly unaudited financial statements, our disclosures under "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the selection, application and disclosure of critical accounting policies and practices used in such financial statements; and
- discuss with management and the outside auditors any significant financial reporting issues and judgments made in connection with the preparation of our financial statements, including any significant changes in our selection or application of accounting principles, any major issues as to the adequacy of our internal controls and any special steps adopted in light of material control deficiencies.

Upon completion of this offering, the audit committee will consist of Ms. Ross, Mr. McFadden and Mr. Ginns, with Ms. Ross serving as the chairperson of the committee. Our board of directors has determined that each member of the audit committee, other than _____, meets the independence requirements of Rule 10A-3 under the Exchange Act and the governance and listing standards of the New York Stock Exchange. We intend to comply with the audit committee requirements of the Sarbanes-Oxley Act and the governance and listing standards of the New York Stock Exchange. Pursuant to such requirements, the audit committee must be composed of at least three members, a majority of whom must be independent within 90 days of the date of this prospectus, and all of whom must be independent within one year of the date of this prospectus. Our board of directors has determined that _____ is an "audit committee financial expert" within the meaning of the SEC regulations. Prior to the consummation of this offering, our board of directors will adopt a written charter under which the audit committee will operate. A copy of the charter, which will satisfy the applicable standards of the SEC and the New York Stock Exchange, will be available on our website.

Compensation Committee

The purpose of the compensation committee is to assist the board of directors in fulfilling its responsibilities relating to oversight of the compensation of our directors, executive officers and other employees and the administration of our benefits and equity-based compensation programs. The compensation committee reviews and recommends to our board of directors compensation plans, policies and programs and approves specific compensation levels for all executive officers. Upon completion of this offering, the compensation committee will consist of Mr. Walsh, Mr. Currie and Mr. Boyce, with Mr. Walsh serving as the chairperson of the committee. Our board of directors has determined that each member of the compensation committee, other than _____, meets the independence requirements under the governance and listing standards of the New York

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Stock Exchange. We intend to comply with the compensation committee requirements of the governance and listing standards of the New York Stock Exchange. Pursuant to such requirements, the compensation committee must consist of a majority of independent members within 90 days of the date of this prospectus and all independent members within one year of the date of this prospectus. Prior to the consummation of this offering, our board of directors will adopt a written charter under which the compensation committee will operate. A copy of the charter, which will satisfy the applicable standards of the SEC and the New York Stock Exchange, will be available on our website.

Nominating and Corporate Governance Committee

The purpose of the nominating and corporate governance committee is to identify individuals qualified to become members of the board of directors, recommend to the board of directors director nominees for the next annual meeting of shareholders, develop and recommend to the board of directors a set of corporate governance principles applicable to the company, oversee the evaluation of the board of directors and its dealings with management as well as appropriate committees of the board of directors and review and approve all related party transactions. Upon completion of this offering, the nominating and corporate governance committee will consist of Mr. Brenneman, Mr. Currie and Mr. Craighead, with Mr. Brenneman serving as the chairperson of the committee. Our board of directors has determined that each member of the nominating and corporate governance committee is independent as defined under the governance and listing standards of the New York Stock Exchange. Prior to the consummation of this offering, our board of directors will adopt a written charter under which the nominating and corporate governance committee will operate. A copy of the charter, which will satisfy the applicable standards of the SEC and the New York Stock Exchange, will be available on our website.

Compensation Committee Interlocks and Insider Participation

None of our executive officers serves as a member of the board of directors or compensation committee, or other committee serving an equivalent function, of any other entity that has one or more of its executive officers serving as a member of our board of directors or compensation committee. Upon the completion of this offering, our compensation committee will consist of Mr. Walsh, Mr. Currie and Mr. Boyce. Mr. Walsh is employed by CCMP. For additional information regarding transactions between CCMP and its affiliates and us, see “Certain Relationships and Related Party Transactions.”

EXECUTIVE AND DIRECTOR COMPENSATION

The following discussion and analysis of compensation arrangements should be read with the compensation tables and related disclosures set forth below. This discussion contains forward-looking statements that are based on our current plans and expectations regarding future compensation programs. Actual compensation programs that we adopt may differ materially from the programs summarized in this discussion.

Compensation Discussion and Analysis

This section discusses the principles underlying the material components of our executive compensation program for our executive officers who are named in the Summary Compensation Table and the factors relevant to an analysis of these policies and decisions. For the year ended December 31, 2016, our “named executive officers” included our principal executive officer, our principal financial officer and our next three most highly compensated executive officers and our former principal executive officer.

<u>Name</u>	<u>Title</u>
James Gentilcore ⁽¹⁾	President and Chief Executive Officer (since July 1, 2016)
Michael Crews	EVP and Chief Financial Officer
Scott Randolph	EVP and Group President Performance Materials & Chemicals
Paul Ferrall	EVP and Group President Environmental Catalysts & Services
Ray Kolberg ⁽²⁾	President, Catalyst Product Group
George Biltz ⁽³⁾	President and Chief Executive Officer (until June 24, 2016)

(1) Mr. Gentilcore joined PQ Group Holdings Inc. as the President and Chief Executive Officer on July 1, 2016.

(2) As a result of an internal restructuring of the company’s business units in 2016, Mr. Kolberg reports to Mr. Ferrall and is no longer an executive officer of the company.

(3) Mr. Biltz stepped down as President and Chief Executive Officer effective June 24, 2016 and terminated employment with the company effective July 31, 2016.

2016 Compensation Decisions

Our executive compensation programs are determined and approved by the Compensation Committee. During 2016, the Compensation Committee was responsible for the oversight, implementation and administration of all of our executive compensation plans and programs. None of the named executive officers are members of the Compensation Committee or otherwise had any role in determining the compensation of the other named executive officers. However, the Compensation Committee does consider the recommendations of our Chief Executive Officer in setting compensation levels for our executive officers other than our Chief Executive Officer. The Compensation Committee determined all of the components of the compensation of our Chief Executive Officer.

Executive Compensation Program Philosophy and Overview

Our compensation philosophy is to provide pay that:

- Aligns the interests of our named executive officers with our shareholders’ interests by rewarding performance that is tied to creating shareholder value; and
- Provides an amount and mix of total compensation for each of our named executive officers that we believe is competitive.

We seek to implement our pay philosophy by providing a total compensation package which includes three main components: base salary, annual performance-based bonus and long-term equity-based awards. The Compensation Committee has taken into account individual performance and competitive market practice in sizing the compensation package for each named executive officer. In assessing market competitive practices, the Compensation Committee has historically relied on its experience and knowledge of general industry practices.

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In conjunction with this offering, the Compensation Committee intends to make a more formal effort to compare executive officer compensation with market data. To that end, a compensation peer group has been formed, and is referenced in the discussion below. We will utilize a peer group as a tool in making compensation decisions for 2017, and expect to continue to utilize one when making compensation decisions going forward.

Base salary has been set with a view toward attracting and retaining executive officer talent.

Our annual incentive plan (the "PQIP") is a broad based plan which pays according to the achievement of annual EBITDA goals, either on a company-wide or individual division basis.

Our long-term equity-based awards consist of stock options and restricted stock that are subject to time and/or performance vesting conditions. The long-term equity based awards made prior to this offering were made in amounts intended to be competitive for private equity backed ventures in the specialty chemicals space. The size of grants already made was not determined with reference to public company market data.

Each of these elements of compensation is discussed in more detail, below.

We believe that our executive compensation program is strongly aligned with the interests of our shareholders:

- For several years before this offering our named executive officers and senior leadership team have been significant owners of the company, and we expect this to continue.
- Our named executive officers and senior leadership have been offered the opportunity to purchase equity in the company over the last several years, in addition to receiving equity as a form of incentive compensation.
- By providing a substantial portion of our named executive officers' total compensation package in the form of equity-based awards we have been able to create an incentive to build shareholder value over the long-term.
- By structuring the equity awards as time and performance vested stock options and full value restricted shares, we have built a strong pay for performance culture.
- Our annual performance-based bonus is contingent upon the achievement of financial performance metrics and the amount of compensation ultimately received for these awards varies with our annual financial performance, thereby providing an additional incentive to maximize shareholder value.

We intend to continue to promote share ownership and a strong pay for performance culture following this offering. We believe that this philosophy has been successful in motivating, retaining and incentivizing our named executive officers and providing value to our shareholders.

Compensation Consultant; Review of Relevant Compensation Data

The Compensation Committee has engaged Compensation & Benefit Solutions ("CBS") as the independent advisor to the Compensation Committee effective in 2017. The compensation consultant reviews the company's overall executive officer and director compensation in comparison to comparably-sized public companies in industries similar to the company's, helps the Compensation Committee identify the appropriate mix of compensation components for compensating our executive officers, and facilitates the Compensation Committee's determination of our executive officers' incentive based compensation. CBS does not provide any other services to the company or our management or have any other direct or indirect business relationships with us or our management. The Compensation Committee has assessed the independence of CBS and concluded that its work does not raise any conflicts of interest.

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Previously, the Compensation Committee did not utilize a peer group for purposes of determining executive compensation. In connection with this offering, the Compensation Committee selected a peer group of companies in the chemical and specialty chemical space with revenues ranging from approximately 50%-200% of the company's revenues. Compensation data drawn from the peer group will be a source of data which the company will draw on in 2017.

Albermarle Corporation	International Flavors & Fragrances, Inc.	Quaker Chemical Corporation
Cabot Corporation	Kraton Corporation	A. Schulman Inc.
FMC Corporation	Lanxess Solutions US Inc.	Sensient Technologies Corporation
GCP Applied Technology	Minerals Technologies, Inc.	Stepan Company
H.B. Fuller Company	MPM Holdings Inc.	W.R. Grace
Innophos Holdings, Inc.	Platform Specialty Products Corp.	Westlake Chemical Partners LP
Innospec, Inc.	PolyOne Corp.	

In 2017, the Compensation Committee intends to review competitive compensation practices and a variety of other factors to confirm that the current structure of our cash compensation and equity-based awards is consistent with our compensation philosophy. In addition, in conjunction with this offering, the Compensation Committee has begun reviewing compensation data provided by CBS in order to determine the appropriate mix between cash compensation and equity-based awards and the appropriate size of equity-based awards in light of this offering, the position of the company after giving effect to this offering and the need to retain the key leadership team following this offering.

Ongoing Role of the Compensation Committee and our Executive Officers in Setting Compensation

On an annual basis the Compensation Committee reviews compensation for the named executive officers in conjunction with performance discussions, salary increase recommendations, determination of bonus payouts, and deliberations regarding long term incentive grants. Going forward, the Compensation Committee will continue to conduct annual reviews of our executive compensation program to ensure that it remains aligned with our compensation philosophy.

Historically, our compensation has been highly individualized, the result of arm's-length negotiations and based on a variety of informal factors including, our financial condition and available resources, our need for a particular position to be filled and the compensation levels of our other executive officers.

Going forward, we expect that our Compensation Committee will make decisions taking into account good governance best practices regarding compensation. This would include reliance on market data for the chemical and specialty chemical industry and the other considerations mentioned in this Compensation Discussion and Analysis.

Elements of Compensation in 2016

For 2016, our compensation program for the named executive officers consisted of:

- Base salary;
- Annual performance based cash awards;
- Long-term equity incentive awards; and
- Other benefits (retirement, health, perquisites, etc.).

Base Salary

We provide an annual base salary to our named executive officers to induce talented executives to join or remain with our company, to compensate them for their services during the year and to provide them with a

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stable source of income. In 2016, each of our named executive officers had an employment agreement or offer letter in place which set his minimum level of annual base salary. In certain cases current base salary has been raised from the minimums specified in the offer letters and employment agreements.

The base salary levels of continuing named executive officers are reviewed annually by our Compensation Committee to determine whether an adjustment is warranted. The Compensation Committee may take into account numerous factors in making its determination, none of which are dispositive or individually weighted, including our financial performance, the state of our industry and local economies in which we operate, the executive officer's relative importance and responsibilities, the executive officer's performance and periodic reference to comparable salaries paid to other executives of similar experience in our industry in general, based on the Compensation Committee's expertise and knowledge of general industry practices. Commencing in 2017, the Compensation Committee will also take into account market data drawn from our peer group, referenced above.

The base salaries paid to our named executive officers during fiscal year 2016 are reported in the "Summary Compensation Table" below. The annual base salaries in effect for each of our named executive officers as of year end 2015 and year end 2016 are as follows:

<u>Name</u>	<u>YE 2015 Annual Salary</u>	<u>YE 2016 Annual Salary</u>
James Gentilcore(1)	—	\$ 825,000
Michael Crews	\$ 425,000	\$ 425,000
Scott Randolph	\$ 425,000	\$ 425,000
Paul Ferrall	\$ 425,000	\$ 425,000
Ray Kolberg(2)	—	\$ 425,000
George Biltz(3)	\$ 750,000	—

(1) Mr. Gentilcore's base salary actually paid was \$412,500 in 2016 because he joined the company on July 1, 2016.

(2) Mr. Kolberg was hired on January 1, 2016.

(3) Mr. Biltz stepped down as President and Chief Executive Officer effective June 24, 2016 and terminated employment with the company effective July 31, 2016. His actual 2016 salary was \$437,500.

In connection with this offering, the Compensation Committee has determined to increase Mr. Gentilcore's base salary to \$880,000 and the base salaries of Messrs. Crews, Randolph and Ferrall to \$480,000, in each case, to be effective the month following the month in which this offering occurs.

Annual Performance-Based Cash Award – The PQIP

We provide our named executive officers with annual performance-based cash award opportunities linked to our annual financial performance. For 2016, the Compensation Committee chose adjusted EBITDA targets to measure our financial performance under the PQIP. For purposes of the PQIP, adjusted EBITDA is defined as earnings before interest and taxes with depreciation and amortization added back and adjusted for the following items: purchase accounting (or similar); losses (gains) on sale of or disposal of long-lived assets; foreign exchange(gains)/losses; revaluation of inventory, including LIFO adjustments; management advisory fees; transaction and other related costs; equity based and other non-cash compensation; restructuring, integration and business optimization expenses; and extraordinary, unusual and non-recurring expenses. These are referred to below as "EBITDA targets."

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The target annual performance-based cash award opportunity for each eligible executive was set as a percentage of annualized base salary (i.e., actual base salary paid during 2016). For 2016 the target award percentages were as follows:

Name	FYE 2016 Target Award
James Gentilcore	100%
Michael Crews	75%
Scott Randolph	75%
Paul Ferrall	75%
Ray Kolberg	75%
George Biltz	100%

The award payable for 2016 to Messrs. Gentilcore, Crews, and Biltz was based on the achievement of the EBITDA targets for each of the four divisions:

- Performance Chemicals – 25%
- Performance Materials – 25%
- Catalyst – 25%
- Refining Services – 25%

To the extent that a division achieved at least 95% of its annual EBITDA target, a threshold bonus of 25% of the targeted bonus attributable to that division was earned. To the extent that a division achieved at least 99% of its annual EBITDA target, the full portion of the executive’s target bonus attributable to that division was earned. Results between threshold and target were determined by linear interpolation.

To the extent that any of the divisions exceeded 100% of its annual EBITDA target, an above-target pool was created. The above target pool was a dollar amount equal to 25% of the EBITDA above target, if any, in each of the four divisions.

Executives who were eligible to participate in the above target pool were allocated a portion of the above target pool as follows:

Dollar value of executive’s target bonus	X	Sum of above target pools in each of the four divisions	=	Executive’s share
Dollar value of all participants’ target bonuses				

Depending on achieved performance levels, Messrs. Gentilcore, Crews and Biltz could earn zero bonus for below threshold performance, 25% of their target bonus opportunity for achievement of threshold performance, and 100% of their target bonus opportunity for achievement of 99% target performance, with no cap for the achievement of above target performance. Amounts earned based on achievement between threshold and target levels are determined by linear interpolation as described above. There is no adjustment of the objectively determined bonus payout based on individual performance. Actual bonus payouts were based on the below formula:

Salary Actually Paid in the Year	x	Target Bonus %, divided equally for each of the four divisions	x	EBITDA Performance Percentage for each of the four divisions	=	Bonus for Performance up to Target	+	Dollar of executive’s target bonus Dollar value of all participants’ target bonuses Sum of the above target pools in each of the four divisions	X	=	Actual Bonus
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The award payable for 2016 for Mr. Randolph was based on the achievement of the Performance Chemicals division. To the extent that Performance Chemicals achieves at least 95% of its annual EBITDA target, a threshold bonus of 25% of the targeted bonus was earned. To the extent that Performance Chemicals achieves at least 99% of its annual EBITDA target, the full target bonus was paid. Results between threshold and target were determined by linear interpolation.

To the extent that Performance Chemicals exceeded its EBITDA target, an above target pool was created as determined in the manner described above. The above target pool was allocated to Mr. Randolph based on the dollar value of his target bonus divided by the dollar value of all participants' target bonuses in the Performance Chemicals group times the value of the above target pool. There is no cap on the percentage of target bonus opportunity for the achievement of above-target performance.

The award payable for 2016 for Mr. Ferrall was based on the achievement of Refining Services (formerly Eco Services). To the extent that Refining Services achieved at least 95% of its annual EBITDA target, a threshold bonus of 25% of the targeted bonus was earned. To the extent that Refining Services achieved at least 99% of its annual EBITDA target, the full target bonus was paid. Results between threshold and target were determined by linear interpolation.

To the extent that Refining Services exceeded 100% of its EBITDA target, an above target pool was created as determined in the manner described above. The above target pool was allocated to Mr. Ferrall based on the dollar value of his target bonus divided by the dollar value of all participants' target bonuses in Refining Services times the value of the above target pool. There is no cap on the percentage of target bonus opportunity for the achievement of above-target performance.

The award payable for 2016 for Mr. Kolberg was based on the achievement of the Catalyst division. To the extent that Catalyst achieved at least 95% of its annual EBITDA target, a threshold bonus of 25% of the targeted bonus was earned. To the extent that Catalyst achieved at least 99% of its annual EBITDA target, the full target bonus was paid. Results between threshold and target were determined by linear interpolation.

To the extent that Catalyst exceeded 100% of its EBITDA target, an above target pool was created as determined in the manner described above. The above target pool was allocated to Mr. Kolberg based on the dollar value of his target bonus divided by the dollar value of all participants' target bonuses in the Catalyst group times the value of the above target pool. There is no cap on the percentage of target bonus opportunity for the achievement of above-target performance.

Actual bonus payouts for Messrs. Randolph, Ferrall and Kolberg were based on the below formula:

Salary Actually Paid in the Year	x	Target Bonus %	x	=	EBITDA Performance Percentage for the division in which executive resides	=	Bonus for Performance up to Target	+	=	Actual Bonus
										<u>Dollar of executive's target bonus</u> Dollar value of all participants' target bonuses in the executive's division X The above target pool in the executive's division

Annual Performance Award Actually Earned in 2016

Annual performance award targets were based upon pro forma adjusted EBITDA for 2016 as set forth below. Actual pro forma adjusted EBITDA for 2016 is also set forth below.

Divisions	Target	Actual
Performance Chemicals	\$ 190.8 million	\$ 166.5 million
Performance Materials (Formerly Potters)	\$ 65.4 million	\$ 65.3 million
Catalyst	\$ 79.3 million	\$ 88.0 million
Refining Services	\$ 128.5 million	\$ 135.0 million

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Actual bonus payouts for each of our executive officers by business division were as follows:

Division	Percentage Earned*	James Gentilcore	Michael Crews	Scott Randolph(1)	Paul Ferrall	Ray Kolberg	George Biltz(2)
Performance Chemicals	87%	\$ 0	\$ 0	\$ 0	N/A	N/A	\$ 0
Performance Materials	100%	\$ 103,125	\$ 79,688	N/A	N/A	N/A	\$ 93,750
Catalyst	111%	\$ 265,374	\$ 205,062	N/A	N/A	\$ 820,246	\$ 241,249
Refining Services	105%	\$ 153,012	\$ 118,236	N/A	\$ 472,947	N/A	\$ 139,102
2016 Total Bonus Award		\$ 521,511	\$ 402,986	\$ 0	\$ 472,947	\$ 820,246	\$ 474,101

* Percentages have been rounded.

- (1) Mr. Randolph did not earn a bonus for 2016 under the terms of the PQIP, but was awarded a special bonus of \$200,000 by the Board for successfully combining Performance Chemicals Worldwide.
- (2) As further described below, in connection with his termination of employment, Mr. Biltz was paid a pro-rata amount of the bonus which he would otherwise have earned under the PQIP in 2016.

Plan Structure for 2017

Commencing in 2017, the PQIP will be structured to reflect our two operating segments:

- Performance Materials & Chemicals Group
- Environmental Catalysts & Services Group

For Messrs. Gentilcore and Crews, target annual performance-based cash incentive opportunities will be based on the achievement of the annual EBITDA targets for the two operating segments:

- Performance Materials & Chemicals Group – 50%
- Environmental Catalysts & Services Group – 50%

To the extent the company exceeds its EBITDA target, an above target pool will be created, as described above for 2016 bonuses but determined based solely on achievement of the company's EBITDA target. An individual executive will be allocated an amount equal to the dollar value of his or her target bonus as a percentage of the dollar amount of all participants' target bonuses, multiplied by the amount in the pool.

For Messrs. Randolph and Ferrall, target annual performance-based cash incentive opportunity will be based on the achievement of the EBITDA target for their respective operating segment:

- Mr. Randolph – 100% Performance Materials & Chemicals Group
- Mr. Ferrall – 100% Environmental Catalysts & Services Group

To the extent the company exceeds its EBITDA target, Messrs. Randolph and Ferrall will be eligible to receive amounts greater than their target bonuses in the same fashion as Messrs. Gentilcore and Crews.

Long-Term Equity Based Incentive Awards

Our equity incentive awards currently consist of restricted stock in the form of Class A Shares, options on Class A Shares, and restricted stock in the form of Class B Shares. Historically, executive officers have received other classes of equity, but over time all of those have been converted into restricted stock in the form of Class A Shares, options on Class A Shares, or restricted stock in the form of Class B Shares.

In keeping with our pay for performance culture, the options and restricted stock are partially time vested, partially performance vested and partially both time and performance vested. The terms of the performance vesting are described in more detail below.

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Our equity incentive awards have typically been made to our named executive officers at the time of hire, promotion into a new position, or as consideration for a change in the terms of an employment contract or offer letter. In addition to these, awards have been made for other specific reasons, including employment contract or offer letter provisions which provide for grants subsequent to hire.

The time vested restricted stock and stock options vest ratably over periods ranging from three to four years, subject to accelerated vesting upon a change in control. The performance based stock options and performance vested restricted stock currently outstanding are all unvested and will only vest upon the occurrence of either: (1) the receipt of aggregate net proceeds by investment funds affiliated with CCMP with respect to their shares of capital stock of the company, when divided by their equity investment in the company, resulting in a quotient equal to or greater than two; or (2) from and after the date of the consummation of this offering, the achievement with respect to shares of common stock of an average closing trading price equal or exceeding, in any 10 trading day period, the lowest amount which when multiplied by the number of shares of common stock then held by investment funds affiliated with CCMP and added to the aggregate net proceeds received by investment funds affiliated with CCMP with respect to their shares of capital stock of the company would yield a quotient of equal or greater than two when divided by the investment funds' affiliated with CCMP equity investment in the company. The quotients described under (1) and (2) above are referred to in this Compensation Discussion & Analysis as the "MOI Target."

Unvested equity awards at the time of this offering will continue to vest pursuant to their original terms following this offering, after giving effect to any conversion of the underlying common stock as a result of the Reclassification described above.

All of our named executive officers currently own vested and unvested equity awards from grants made in and prior to 2016 in the form of time and performance vested restricted stock and options.

Grants Made to Named Executive Officers in 2016

Long term equity based incentive awards were made in 2016 to Mr. Gentilcore, in connection with his joining the company. Mr. Gentilcore's 2016 equity grants were as follows:

Type of award	Shares	Strike price	Grant value(1)	Vesting Terms
Class B restricted	5,412	N/A	\$ 1,000,138	Three year ratable time vesting
Class A options	24,350	\$ 71.06	\$ 716,621	50% ratable three year time vesting and 50% on achievement of the MOI Target
Class B restricted	4,058	N/A	\$ 749,918	50% ratable three year time vesting and 50% on achievement of the MOI Target

- (1) Grant values for awards granted to our named executive officers have been calculated in accordance with SEC rules. See the "Stock Awards" and "Option Awards" columns of the Summary Compensation Table for additional information on how grant date values were determined.

Long term equity based incentive awards were made to Mr. Crews in 2016, in connection with the one year anniversary of his employment:

Type of award	Shares	Strike price	Grant value(1)	Vesting Terms
Class A options	10,349	\$ 71.06	\$ 304,571	50% ratable three year time vesting and 50% on achievement of the MOI Target
Class B restricted	1,725	N/A	\$ 318,780	50% ratable three year time vesting and 50% on achievement of the MOI Target

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Long term equity based incentive awards were made to Mr. Randolph in 2016, in connection with a corporate reorganization tied to the merger of the company with Eco Services. Mr. Randolph also received an additional cash payment in connection with this corporate reorganization in the amount of \$176,529.

Type of award	Shares	Strike price	Grant value(1)	Vesting Terms
Class A options	17,255	\$ 70.94	\$ 507,815	25% per year ratable time vesting with the first year deemed vested at the time of grant.

Long term equity based incentive awards were made to Mr. Ferrall in 2016, in connection with a corporate reorganization tied to the merger of the company with Eco Services. Mr. Ferrall also received an additional cash payment in connection with this corporate reorganization in the amount of \$176,529.

Type of award	Shares	Strike price	Grant value(1)	Vesting Terms
Class A options	17,255	\$ 70.94	\$ 507,815	25% per year ratable time vesting with the first year deemed vested at the time of grant.

Long term equity based incentive awards were made to Mr. Kolberg in 2016, in connection with the start of his employment, in accordance with his offer letter.

Type of award	Shares	Strike price	Grant value(1)(2)	Vesting Terms
Class A options	6,178	\$ 60.71	\$ 76,916	50% time vesting (1,544 options vesting on 1/1/18 and 1,545 options vesting on 1/1/20) and 50% - 3,089 options are performance and time vesting, on the earlier of achievement of the MOI Target or 1/1/20
Class B restricted	2,645	N/A	\$ 425,078	50% time vesting (661 shares vesting on 1/1/18 and 661 shares vesting on 1/1/20) and 50% - 1,323 shares are performance and time vesting, on the earlier of achievement of the MOI Target or 1/1/20

(2) Mr. Kolberg's awards in 2016 were made prior to the Business Combination. In connection with the Business Combination, Mr. Kolberg's awards were converted to awards of the company. For information on the valuation assumptions made in the calculation of the PQ Holding's awards exchanged in connection with the Business Combination, refer to Note 21 to the audited consolidated financial statements of PQ Group Holdings Inc. and subsidiaries included elsewhere in this prospectus.

Long term equity based incentive awards were made to Mr. Biltz in 2016, in connection with the one year anniversary of his employment, per his offer letter. However, as noted below, all of these awards, other than 1,555 of the time vesting restricted Class B shares, were forfeited as a result of Mr. Biltz's termination of employment and/or the failure of the performance vesting targets to be achieved.

Type of award	Shares	Strike price	Grant value(1)	Vesting Terms
Class A options	24,350	\$ 70.94	\$ 716,621	50% ratable three year time vesting and 50% on achievement of the MOI Target
Class B restricted	4,667	N/A	\$ 862,462	50% ratable three year time vesting and 50% on achievement of the MOI Target

Grants Made to Mr. Gentilcore in 2017

Long term equity based incentive awards were made to Mr. Gentilcore in 2017, to correct a shortfall in his initial new hire grants (the grant date value of which had been initially determined using a target value that

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assumed a lower base salary than Mr. Gentilcore actually receives). The company granted Mr. Gentilcore an option to purchase 2,435 shares of Class A common stock and 406 restricted Class B shares. These awards have the same vesting terms as the grants of time and performance vested restricted stock and options made to Mr. Gentilcore in 2016.

We expect to adopt a schedule of regular periodic grants once our shares become publicly traded. We anticipate awarding a significant portion of the annual pay mix in equity incentive awards for our executive officers, in a manner that is consistent with our compensation philosophy and competitive with our peer group practices.

Additional Executive Benefits and Perquisites

We provide our named executive officers with certain executive benefits that the Compensation Committee believes are reasonable and in the best interests of the company and our shareholders. These are described in the footnotes to our 2016 Summary Compensation Table below. Consistent with our compensation philosophy, and subject to any revisions discussed below, we currently intend to continue to maintain our current benefits for our named executive officers, including executive physicals, life insurance and other benefits described in the footnotes below. The Compensation Committee, in its discretion, may revise, amend or add to an officer's executive benefits if it deems it advisable. We believe these benefits are generally equivalent to benefits provided by comparable companies based on our expertise and knowledge of general industry practices.

Health and Welfare Benefits

Our named executive officers have the option to participate in various employee welfare benefit programs, including medical, dental and life insurance benefits. These benefit programs are generally available to all employees.

Relocation Assistance

The company's business needs require it on occasion to relocate certain employees. To meet this need, we may, on a case by case basis, cover certain expenses, including temporary housing, relocation, living and travel expenses. Relocation payments made in 2016 are described in the footnotes to our 2016 Summary Compensation Table below.

Employment Agreements; Severance and Change in Control Benefits

The company has entered into employment agreements or offer letters with our named executive officers that provide benefits upon a termination of employment. The material terms of these agreements are summarized below under “—Narrative Disclosure to the Summary Compensation Table and Grants of Plan-Based Awards Table” and “—Potential Payments Upon Termination or Change in Control”. We anticipate that in connection with this offering we will make changes to certain of the arrangements with our named executive officers, including terminating certain of these employment agreements and offer letters, as applicable, and entering into new severance agreements with certain of our named executive officers.

Severance Payments to Mr. Biltz

Mr. Biltz received certain payments and benefits upon his stepping down and termination of employment in 2016. In accordance with the terms of his offer letter, and in consideration of Mr. Biltz entering into a release and waiver of claims, and subject to his compliance with the restrictive covenants set forth in his offer letter, the company agreed to pay or provide Mr. Biltz the following: (i) base salary of \$750,000 plus target bonus of \$750,000, plus health benefits at active employee contribution rates in installments over a two year period beginning August 1, 2016 and (ii) a pro-rata amount of the annual performance bonus which would have been

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earned in 2016 (amount actually earned equal to \$474,101). Pursuant to his separation agreement, in exchange for Mr. Biltz entering into a release and waiver of claims, the company agreed not to repurchase Mr. Biltz's 17,111 vested restricted Class B shares and the 18,668 Class B shares purchased by Mr. Biltz in 2015.

At the time of Mr. Biltz's separation, in accordance with the terms of Mr. Biltz's equity awards, Mr. Biltz had the right to vest in: (a) 37,125 Class A options provided the MOI Target was achieved on or before the six month anniversary of his last work date of June 24, 2016 and (b) 15,556 Class B restricted shares, provided the MOI Target was achieved on or before the six month anniversary of his separation date of July 31, 2016. The MOI Target for these options and shares was not met on the specified dates, and those shares and options were forfeited. In addition, in accordance with the terms of Mr. Biltz's equity awards, at the time of his termination of employment, he was entitled to accelerated vesting of those time-based restricted shares that would have vested during the two year period following his separation date, which resulted in vesting of 10,371 of his unvested time vesting Class B restricted shares granted in 2015 and 1,555 of his unvested time vesting Class B restricted shares granted in 2016.

Accounting and Tax Considerations

In determining which elements of compensation are to be paid, and how they are weighted, on a going forward basis, we expect to take into account whether a particular form of compensation will be deductible under Section 162(m) of the Code. Section 162(m) generally limits the deductibility of compensation paid to our named executive officers (other than our Chief Financial Officer) to \$1 million during any fiscal year unless such compensation is "performance-based" under Section 162(m). However, under a Section 162(m) transition rule for compensation plans or agreements of corporations which are privately held and which become publicly held in an initial public offering, compensation paid under a plan or agreement that existed prior to the initial public offering, will not be subject to Section 162(m) until the earliest of (1) the expiration of the plan or agreement, (2) a material modification of the plan or agreement, (3) the issuance of all employer stock and other compensation that has been allocated under the plan, or (4) the first meeting of shareholders at which directors are to be elected that occurs after the close of the third calendar year following the year of the initial public offering, (the "Transition Date"). After the Transition Date, rights or awards granted under the plan, other than options and stock appreciation rights, will not qualify as "performance-based compensation" for purposes of Section 162(m) unless such rights or awards are granted or vest upon pre-established objective performance goals and certain other requirements are met.

Going forward, our intent generally is to design and administer executive compensation programs in a manner that will preserve the deductibility of compensation paid to our executive officers. However, we reserve the right to design programs that recognize a full range of performance criteria important to our success, even where the compensation paid under such programs may not be deductible. The Compensation Committee will continue to monitor the tax and other consequences of our executive compensation program as part of its primary objective of ensuring that compensation paid to our executive officers is reasonable, performance-based and consistent with the goals of the company and its shareholders.

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Summary Compensation Table

The following table sets forth certain information with respect to compensation earned by or paid to our named executive officers for the year ended December 31, 2016.

Name and Principal Position	Year	Salary (\$)	Bonus \$(3)	Stock Awards \$(4)	Option Awards \$(4)	Non-Equity Incentive Plan Compensation \$(5)	All Other Compensation \$(6)(7)(8)	Total (\$)
James Gentilcore(1) <i>Chief Executive Officer</i>	2016	412,500	—	1,750,056	716,621	521,511	17,940	3,418,628
Michael Crews <i>Chief Financial Officer</i>	2016	425,000	—	318,780	304,571	402,986	94,924	1,546,261
Scott Randolph <i>President PM&C Group</i>	2016	425,000	200,000	—	507,815	—	232,853	1,365,668
Paul Ferrall <i>President EC&S Group</i>	2016	425,000	—	—	507,815	472,947	217,696	1,623,458
Ray Kolberg <i>President Catalyst Group</i>	2016	425,000	200,000	437,883	162,881	820,246	99,563	2,145,573
George Biltz(2) <i>Former Chief Executive Officer</i>	2016	437,500	—	862,462	716,621	474,101	650,696	3,141,380

- (1) Mr. Gentilcore became our Chief Executive Officer on July 1, 2016. Compensation reported for Mr. Gentilcore is with respect to the portion of fiscal year 2016 following this date.
- (2) Mr. Biltz stepped down as President and Chief Executive Officer effective June 24, 2016 and he terminated employment with the company effective July 31, 2016.
- (3) Mr. Randolph was awarded a special bonus of \$200,000 by our board of directors for successfully combining Performance Chemicals Worldwide. Mr. Kolberg was awarded a \$200,000 sign on bonus.
- (4) The amounts shown reflect the aggregate grant date fair value of time- and performance-based restricted stock and stock options granted in 2016, computed in accordance with ASC Topic 718, disregarding the effects of estimated forfeitures. These amounts reflect our cumulative accounting expense over the vesting period and do not correspond to the actual value that may be realized by the named executive officers. As discussed above under “—Grants Made to Named Executive Officers in 2016”, Mr. Kolberg’s awards were converted to awards of the company in connection with the Business Combination. Accordingly, the amounts reported in the table for Mr. Kolberg’s awards reflect the grant date fair value of the awards (\$76,916 for the stock options and \$425,078 for the restricted stock) and the incremental fair value of the awards (\$85,965 for the stock options and \$12,805 for the restricted stock), computed as of the modification date in accordance with FASB ASC Topic 718 with respect to the modified awards. For information on the valuation assumptions made in the calculation of these amounts, refer to Note 21 to the audited consolidated financial statements of PQ Group Holdings Inc. and subsidiaries included elsewhere in this prospectus. With respect to stock options and restricted stock awards subject to performance-based vesting conditions, the aggregate grant date fair value was determined based on the probable outcome of the performance conditions associated with such awards at the date of grant. For performance-based stock options, the aggregate grant date fair value of these awards, assuming the maximum level of performance is achieved, is: Mr. Gentilcore, \$358,311, Mr. Crews, \$152,300, and Mr. Biltz, \$358,311. For performance-based restricted stock awards, the aggregate grant date fair value of these awards, assuming the maximum level of performance is achieved, is: Mr. Gentilcore, \$374,959, Mr. Crews, \$159,482 and Mr. Biltz, \$431,323.
- (5) Represents amounts paid under the company’s performance-based annual incentive plan, the PQIP.
- (6) This column includes matching and other contributions made under the company’s 401(k) plan and perquisites and other personal benefits, as set forth in the below table.
- (7) Mr. Randolph and Mr. Ferrall each received additional cash compensation in the amount of \$176,529 related to an exchange of equity in connection with a corporate reorganization tied to the merger of the company with Eco Services.
- (8) Includes \$633,882 in severance related payments and benefits received by Mr. Biltz in 2016.

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Name	401(k) Plan Company Match (\$)	401(k) Plan Company 4% Contribution (\$)	PRA SERP Company Contributions (\$)	Tax Prep Services (\$)	Executive Physical (\$)	Relocation Expense (\$)	Life Insurance (\$)
James Gentilcore	—	10,600	5,900	—	—	—	1,440
Michael Crews	7,950	10,600	7,728	—	—	67,422	1,224
Scott Randolph	7,950	10,600	15,005	21,545	—	—	1,224
Paul Ferrall	7,950	10,600	8,551	12,842	—	—	1,224
Ray Kolberg	6,888	10,600	6,400	—	—	74,451	1,224
George Biltz	7,950	—	—	—	3,596	5,268	—

2016 Grants of Plan-Based Awards

The following table summarizes plan-based awards granted to our named executive officers for the year ended December 31, 2016.

Name	Grant Date	Estimated Future Payouts Under Non-Equity Incentive Plan Awards			Estimated Future Payouts Under Equity Incentive Plan Awards (#)(2)	All Other Stock Awards: Number of Shares of Stock or Units (#)(3)	All Other Awards: Number of Securities Underlying Options (#)(3)	Exercise or Base Price of Option Awards (\$/Sh)	Grant Date or Fair Value of Stock and Option Awards (\$)(4)
		Threshold (\$)(1)	Target (\$)(1)	Maximum (\$)(2)					
James Gentilcore	July 1	103,125	412,500	N/A	—	—	—	—	—
	June 30	—	—	—	12,175	—	12,175	71.06	716,621
	June 30	—	—	—	—	5,412	—	—	1,000,138
Michael Crews	June 30	—	—	—	2,029	2,029	—	—	749,918
	Jan 1	79,688	318,750	N/A	—	—	—	—	—
	June 30	—	—	—	5,175	—	5,174	71.06	304,571
Scott Randolph	June 30	—	—	—	863	862	—	—	318,780
	Jan 1	79,688	318,750	N/A	—	—	—	—	—
	May 4	—	—	—	—	—	17,255	70.94	507,815
Paul Ferrall	Jan 1	79,688	318,750	N/A	—	—	—	—	—
	May 4	—	—	—	—	—	17,255	70.94	507,815
Ray Kolberg	Jan 1	79,688	318,750	N/A	—	—	—	—	—
	Jan 1	—	—	—	3,089	—	3,089	60.71	162,881
	Jan 1	—	—	—	1,323	1,322	—	—	437,883
George Biltz	Jan 1	109,375	437,500	N/A	—	—	—	—	—
	May 31	—	—	—	12,175	—	12,175	70.94	716,621
	May 31	—	—	—	2,334	2,333	—	—	862,462

- Represents potential payments pursuant to the PQIP, the company's performance-based annual bonus plan. Payments under the PQIP are based on a percentage of the base salary actually paid to each named executive officer during 2016. There is no cap on the amount of bonuses that may be earned under the PQIP. See "Annual Performance-Based Cash Award – The PQIP" in the Compensation Discussion and Analysis section above.
- Reflects restricted stock or options to purchase shares of our common stock, which will immediately vest in full upon the occurrence, of either: (1) the receipt of aggregate net proceeds by investment funds affiliated with CCMP with respect to their shares of capital stock of the company, when divided by their equity investment in the company, results in the MOI Target being satisfied; or (2) from and after the date of the

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consummation of this offering, the achievement with respect to shares of common stock of an average closing trading price equal or exceeding, in any 10 trading day period, the lowest amount which when multiplied by the number of shares of common stock then held by investment funds affiliated with CCMP and added to the aggregate net proceeds received by investment funds affiliated with CCMP with respect to their shares of capital stock of the company, when divided by their equity investment in the company, would yield a quotient of equal or greater than the MOI Target.

- (3) Reflects restricted stock or options to purchase shares of our common stock, which will vest subject to the time vesting conditions described under *Grants Made to Named Executive Officers in 2016* in the Compensation Discussion and Analysis section above.
- (4) As required by SEC rules, amounts shown in the column “Grant Date Fair Value of Stock and Option Awards” present the aggregate grant date fair value of stock and option awards granted in the fiscal year in accordance with ASC Topic 718, disregarding the effects of estimated forfeitures. See note (4) to the Summary Compensation Table above. As discussed above under “—Grants Made to Named Executive Officers in 2016”, Mr. Kolberg’s awards were converted to awards of the company in connection with the Business Combination. Accordingly, the amounts reported in the table for Mr. Kolberg’s awards reflect the grant date fair value of the awards (\$76,916 for the stock options and \$425,078 for the restricted stock) and the incremental fair value of the awards (\$85,965 for the stock options and \$12,805 for the restricted stock), computed as of the modification date in accordance with FASB ASC Topic 718 with respect to the modified awards.

Narrative Disclosure to the Summary Compensation Table and Grants of Plan-Based Awards Table

Employment Agreements

We have entered into employment agreements or offer letters with each of our named executive officers, which were in effect during fiscal year 2016. The material terms of the agreements or offer letters, as applicable, with Messrs. Gentilcore, Crews, Randolph, Ferrall and Kolberg are described below. In addition, each of the agreements or offer letters, as applicable, with Messrs. Gentilcore, Crews, Randolph, Ferrall and Kolberg provides for certain payments and benefits upon terminations of employment, as described below under “—Potential Payments Upon Termination or Change in Control.” As discussed above, Mr. Biltz terminated employment with the company on July 31, 2016.

James Gentilcore

Pursuant to his offer letter, dated June 15, 2016, Mr. Gentilcore is entitled to an annual base salary of \$825,000, subject to periodic review by our board of directors or the Compensation Committee. Mr. Gentilcore is also eligible for an annual incentive bonus with a target of 100% of his annual base salary, subject to the company’s achievement of EBITDA goals established by our board of directors or the Compensation Committee. Mr. Gentilcore’s offer letter provides for his participation in the company’s equity plan, including a 2016 annual equity grant consisting of stock options and restricted stock, which awards were granted to Mr. Gentilcore in 2016 subject to the vesting conditions described above under “—Grants Made to Named Executive Officers in 2016”. Mr. Gentilcore is entitled to participate in any employee benefit plans and programs maintained by the company, subject to the terms of such plans.

Michael Crews

Pursuant to his offer letter, dated June 27, 2015, Mr. Crews is entitled to an annual base salary of \$425,000, subject to adjustment by the Compensation Committee. Mr. Crews is also eligible for an annual incentive bonus with a target of 75% of his annual base salary, based on the company’s achievement of financial performance goals established by our board of directors or the Compensation Committee. Mr. Crews’ offer letter provides for his participation in the company’s equity plan and any employee benefit plans and programs maintained by the company, subject to the terms of such plans.

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Scott Randolph

Pursuant to his employment agreement, dated January 1, 2013, and amended as of April 30, 2015, Mr. Randolph is entitled to an annual base salary of \$341,000, subject to annual review and increase by our board of directors or the Compensation Committee. As described above, Mr. Randolph's annual base salary has been subsequently increased to \$425,000. Mr. Randolph is also eligible for an annual incentive bonus with a target of 50% of his annual base salary, which has subsequently been increased to 75% of his annual base salary, based on the company's achievement of performance goals established by our board of directors or the Compensation Committee. Mr. Randolph is entitled to participate in the standard benefit plans and programs available to the company's employees generally, subject to the terms and conditions of such plans. The initial term of Mr. Randolph's employment agreement is five years, subject to renewal for one or more additional one-year periods upon mutual agreement.

Paul Ferrall

Pursuant to his employment agreement, dated January 1, 2013, and amended as of April 30, 2015, Mr. Ferrall is entitled to an annual base salary of \$341,000, subject to annual review and increase by our board of directors or the Compensation Committee. As described above, Mr. Ferrall's annual base salary has been subsequently increased to \$425,000. Mr. Ferrall is also eligible for an annual incentive bonus with a target of 50% of his annual base salary, which has subsequently been increased to 75% of his annual base salary, based on the company's achievement of financial performance goals established by our board of directors or the Compensation Committee. Mr. Ferrall is entitled to participate in the standard benefit plans and programs available to the company's employees generally, subject to the terms and conditions of such plans. The initial term of Mr. Ferrall's agreement is five years, subject to renewal for one or more additional one-year periods upon mutual agreement.

Raymond Kolberg

Pursuant to his offer letter, dated December 8, 2015, Mr. Kolberg is entitled to an annual base salary of \$425,000, subject to adjustment by the Compensation Committee. Mr. Kolberg is also eligible for an annual incentive bonus with a target of 75% of his annual base salary, based on the company's achievement of financial performance goals established by our board of directors or the Compensation Committee. Mr. Kolberg's offer letter provides for his participation in the company's equity plan and provided for a one-time sign-on 2016 equity grant consisting of stock options and restricted stock, subject to the vesting conditions described above under "*Grants Made to Named Executive Officers in 2016*". Mr. Kolberg's offer letter also provided for a one-time sign-on cash bonus of \$200,000, to be paid on or before March 15, 2016, and for the reimbursement of moving expenses in connection with his relocation to Pennsylvania. Mr. Kolberg is entitled to participate in any employee benefit plans and programs maintained by the company, subject to the terms of such plans.

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2016 Outstanding Equity Awards at Fiscal Year-End

The following table sets forth certain information with respect to outstanding equity awards held by our named executive officers as of December 31, 2016.

Name	Grant Date	Option Awards					Stock Awards			
		Number of securities underlying unexercised options (#) exercisable	Number of securities underlying unexercised options (#) unexercisable	Equity incentive plan awards: number of securities underlying unexercised unearned options (#)	Option exercise price (\$)	Option expiration date	Number of shares or units of stock that have not vested (#)	Market value of shares or units of stock that have not vested (\$)	Equity incentive plan awards: number of unearned shares, units or other rights that have not vested (#)	Equity incentive plan awards: market or payout value of unearned shares, units or other rights that have not vested (\$)(14)
James Gentilcore	6/30/2016 ⁽¹⁾	—	—	—	—	—	5,412	1,044,462	—	—
	6/30/2016 ⁽¹⁾⁽²⁾	—	—	—	—	—	2,029	391,577	2,029	391,577
	6/30/2016 ⁽³⁾⁽⁴⁾	—	12,175	12,175	71.06	6/30/2026	—	—	—	—
Michael Crews	8/1/2015 ⁽⁵⁾⁽⁶⁾	—	—	—	—	—	3,500	675,465	3,500	675,465
	8/1/2015 ⁽⁷⁾⁽⁸⁾	—	3,089	3,089	60.71	8/1/2025	—	—	—	—
	6/30/2016 ⁽¹⁾⁽²⁾	—	—	—	—	—	862	166,357	863	166,550
	6/30/2016 ⁽³⁾⁽⁴⁾	—	5,174	5,175	71.06	6/30/2026	—	—	—	—
Scott Randolph	9/19/2007 ⁽⁹⁾	—	—	—	—	—	—	—	5,966	1,151,378
	2/24/2010 ⁽⁹⁾	—	—	—	—	—	—	—	3,652	704,799
	4/30/2015 ⁽¹⁾	—	—	—	—	—	4,149	800,176	—	—
	5/4/2016 ⁽¹⁰⁾	—	8,628	—	70.94	5/4/2026	—	—	—	—
	5/4/2016 ⁽¹¹⁾	8,627	—	—	70.94	5/4/2026	—	—	—	—
Paul Ferrall	9/19/2007 ⁽⁹⁾	—	—	—	—	—	—	—	5,966	1,151,378
	2/24/2010 ⁽⁹⁾	—	—	—	—	—	—	—	3,652	704,799
	4/30/2015 ⁽¹⁾	—	—	—	—	—	4,149	800,176	—	—
	5/4/2016 ⁽¹⁰⁾	—	8,628	—	70.94	5/4/2026	—	—	—	—
	5/4/2016 ⁽¹¹⁾	8,627	—	—	70.94	5/4/2026	—	—	—	—
Ray Kohlberg	1/1/2016 ⁽¹²⁾	—	3,089	3,089	60.71	1/1/2026	—	—	—	—
	1/1/2016 ⁽¹³⁾	—	—	—	—	—	1,322	255,133	1,323	255,326

- (1) Time-based Class B restricted shares will vest in three equal installments, beginning on the first anniversary of the grant date, provided the named executive officer is still employed on the vesting date by us or one of our subsidiaries.
- (2) Performance-based Class B restricted shares will vest on achievement of the MOI Target.
- (3) Time-based Class A options will vest in three equal installments, beginning on the first anniversary of the grant date, provided the named executive officer is still employed on the vesting date by us or one of our subsidiaries.
- (4) Performance-based Class A options will vest on the achievement of the MOI Target.
- (5) Time-based Class B restricted shares will vest in two equal installments, with 50% vesting on the second anniversary of grant date and 50% vesting on the fourth anniversary of grant date, provided the named executive officer is still employed on the vesting date by us or one of our subsidiaries.
- (6) Performance-based Class B restricted shares will vest on the earlier of the achievement of the MOI Target or August 1, 2019.
- (7) Time-based Class A options will vest in two equal installments, with 50% vesting on the second anniversary of grant date and 50% vesting on the fourth anniversary of grant date, provided the named executive officer is still employed on the vesting date by us or one of our subsidiaries.

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- (8) Performance-based Class A options will vest on the earlier of the achievement of the MOI Target or August 1, 2019.
- (9) Performance-based Class A restricted shares will vest on the achievement of the MOI Target.
- (10) Time-based Class A options will vest in four equal installments, beginning on the first anniversary of the grant date, provided the named executive officer is still employed on the vesting date by us or one of our subsidiaries. These options were granted in an exchange of equity in connection with a corporate reorganization tied to the merger of the company with Eco Services.
- (11) These options to purchase shares of our Class A common stock became exercisable on May 4, 2016 (4,313 shares) and December 1, 2016 (4,314 shares). These options were granted in an exchange of equity in connection with a corporate reorganization tied to the merger of the company with Eco Services.
- (12) These Class A options are 50% time-vesting only (1,544 options vesting on January 1, 2018 and 1,545 options vesting on January 1, 2020) and 50% are performance- and time-vesting (3,089 options vesting on the earlier of achievement of the MOI Target or January 1, 2020).
- (13) These Class B restricted shares are 50% time-vesting only (661 shares vesting on January 1, 2018 and 661 shares vesting on January 1, 2020) and 50% performance- and time-vesting (1,323 shares vesting on the earlier of achievement of the MOI Target or January 1, 2020).
- (14) Fair market value has been determined based on an estimated fair market value per share of Class B common stock of \$192.99, as of December 31, 2016.

Option Exercises and Stock Vested in 2016

The following table shows amounts realized by our named executive officers upon the vesting of restricted stock during the year ended December 31, 2016. Messrs. Gentilcore, Crews and Kolberg did not have any restricted stock vesting in 2016. None of our named executive officers exercised any stock options during 2016.

Name	Stock Awards	
	Number of Shares Acquired on Vesting (#)	Value Realized on Vesting (\$)(1)
James Gentilcore	—	—
Mike Crews	—	—
Scott Randolph	2,074	383,275
Paul Ferrall	2,074	383,275
Ray Kolberg	—	—
George Biltz	17,111	3,162,113

- (1) Amounts reflect the aggregate dollar amount realized upon vesting by multiplying the number of shares of stock that vested by the fair market value of the underlying stock on the applicable vesting date.

Retirement Plan Benefits

We maintain a tax-qualified 401(k) defined contribution plan in which substantially all of our full-time U.S. employees, including our named executive officers, are eligible to participate. We currently provide an employer contribution equal to 4% of qualifying earnings and an employer matching contribution equal to 50% of a participant's contributions up to 6% of qualifying earnings, subject to limits established by the Code. In addition, our named executive officers participate in the PQ Corporation Non-Qualified Personal Retirement Account Excess Savings Plan, an excess benefit plan designed to provide supplemental Personal Retirement Account contributions that cannot be provided under our 401(k) plan due to Code limits. We believe these plans provide our named executive officers with an opportunity for tax-efficient savings and long-term financial security.

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Nonqualified Deferred Compensation

All of our named executive officers participate in the PQ Corporation Non-Qualified Personal Retirement Account Excess Savings Plan, or the PRA SERP. The PRA SERP is an excess benefit plan designed to provide supplemental Personal Retirement Account contributions that cannot be provided under the PQ Corporation Savings Plan due to Code limits. The plan is administered by a committee appointed by our board of directors.

Contributions - There are no executive contributions under the PRA SERP. Each plan year, we credit to participant accounts under the PRA SERP the excess of (a) the amount that would have been credited for that year to the participant's Personal Retirement Account under our 401(k) plan disregarding the dollar limits imposed by the Code for maximum annual compensation over (b) the amount that was actually so credited. The plan administrator may from time to time also elect to make special contributions to participant accounts.

Earning and losses - Participant accounts are deemed to be invested in Vanguard target retirement funds based on a participant's age. At the end of each calendar quarter, we adjust participant accounts with earnings/losses equal to that calendar quarter's return for the applicable target retirement fund.

Vesting and distributions - Participants vest in their accounts under the PRA SERP upon completion of three years of service or, if earlier, death or disability or a change in control. The value of a participant's vested account balance is paid in a lump sum on the first to occur of the participant's separation from service or disability, provided that distributions to "key employees" within the meaning of Section 416(i) of the Code as of the date of the participant's separation from service will not be made until six (6) months after the participant's separation from service or, if earlier, the participant's death.

The following table provides information regarding participation by our named executive officers in the PRA SERP during the year ended December 31, 2016.

Executives do not contribute to the PRA SERP plan.

Name	Executive Contributions in Last FY (\$)	Registrant Contributions in Last FY \$(1)	Aggregate Earnings in Last FY \$(2)	Aggregate Withdrawals/Distributions (\$)	Aggregate Balance at Last FYE \$(3)
James Gentilcore	—	5,900	—	—	—
Michael Crews	—	7,728	—	—	—
Scott Randolph	—	15,005	10,602	—	154,761
Paul Ferrall	—	8,551	6,434	—	101,824
Ray Kolberg	—	6,400	—	—	—
George Biltz	—	—	—	—	—

- (1) Represents company contributions with respect to 2016 that were credited in 2017.
- (2) Earnings are credited quarterly, based on the returns of the appropriate Vanguard Retirement Fund.
- (3) Represents balances under the PRA SERP plan as of December 31, 2016 and does not include amounts attributable to company contributions made with respect to 2016 but not credited until 2017.

Potential Payments Upon Termination or Change in Control

The employment agreements or offer letters with each of Messrs. Gentilcore, Crews, Randolph, Ferrall and Kolberg provide for the following severance payments and benefits in connection with specified termination events, subject to the named executive officer's execution and nonrevocation of a release of claims and continued compliance with the restrictive covenants described below. The terms "cause", "good reason" and "disability" are each defined in the applicable agreements.

As noted above, Mr. Biltz terminated his employment with the company in 2016 and became entitled to receive the benefits described above under "—Severance Payments to Mr. Biltz".

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James Gentilcore

If Mr. Gentilcore's employment is terminated by the company without cause or by him for good reason, he will receive: (i) his base salary and target annual incentive bonus for a two-year period following termination, paid in equal installments in accordance with the normal payroll practices of the company, (ii) continuation of any health benefits at active employee rates for 24 months (or until he otherwise becomes eligible for health benefits as the result of commencing new employment), and (iii) a pro rata amount of any annual incentive bonus that would have been payable in the year of termination based on actual achievement of the applicable performance goals, paid in a lump sum at the time annual bonuses are normally paid. If CCMP no longer controls more than 50% of the voting shares of the company and Mr. Gentilcore does not enter into a new employment agreement with the new owner of the company within 90 days of the date that CCMP no longer controls such percentage of shares, Mr. Gentilcore will be entitled to receive these same severance payments. This provision does not apply in connection with an initial public offering, and will cease to apply following this offering.

If Mr. Gentilcore's employment is terminated due to his death or disability, Mr. Gentilcore (or his estate) will receive a pro rata amount of his target annual incentive bonus.

Michael Crews

If Mr. Crews' employment is terminated by the company without cause or by him for good reason, he will receive: (i) his base salary and target annual incentive bonus for an 18-month period following termination, paid in equal installments in accordance with the normal payroll practices of the company, (ii) continuation of any health benefits at active employee rates for 18 months (or until he otherwise has access to substantially equivalent health benefits as the result of commencing new employment), and (iii) a pro rata amount of any annual incentive bonus that would have been payable in the year of termination based on actual achievement of the applicable performance goals, paid in a lump sum at the time annual bonuses are normally paid.

Scott Randolph

If Mr. Randolph's employment is terminated by the company without cause or by him for good reason, he will receive: (i) two times the sum of his base salary and target annual incentive bonus, paid in a lump sum in accordance with the terms of the employment agreement, (ii) continuation of any health benefits at active employee rates for two years to the extent permitted by the applicable benefit plan, or equivalent reimbursement of the costs for coverage under COBRA, (iii) a pro rata amount of any annual incentive bonus that would have been payable in the year of termination, paid in a lump sum at the time bonuses are normally paid, and (iv) any earned but unpaid annual incentive bonus from prior years, paid in a lump sum at the time bonuses are normally paid.

If Mr. Randolph's employment is terminated due to his death or disability, Mr. Randolph (or his estate or beneficiaries) will receive a pro rata amount of the bonus that would have been earned for the year of termination based on actual performance.

Paul Ferrall

If Mr. Ferrall's employment is terminated by the company without cause or by him for good reason, he will receive: (i) two times the sum of his base salary and target annual incentive bonus, paid in a lump sum in accordance with the terms of the employment agreement, (ii) continuation of any health benefits at active employee rates for two years to the extent permitted by the applicable benefit plan, or equivalent reimbursement of the costs for coverage under COBRA, (iii) a pro rata amount of any annual incentive bonus that would have been payable in the year of termination, paid in a lump sum at the time bonuses are normally paid, and (iv) any earned but unpaid annual incentive bonus from prior years, paid in a lump sum at the time bonuses are normally paid.

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If Mr. Ferrall's employment is terminated due to his death or disability, Mr. Ferrall (or his estate or beneficiaries) will receive a pro rata amount of the bonus that would have been earned for the year of termination based on actual performance.

Raymond Kolberg

If Mr. Kohlberg's employment is terminated by the company without cause, he will receive: (i) his annual base salary and target annual incentive bonus for a 12-month period following his termination, paid in equal installments in accordance with the regular payroll practices of the company, (ii) continuation of any health benefits at active employee rates for 12 months (or until he otherwise has access to substantially equivalent health benefits as the result of commencing new employment), and (iii) a pro rata amount of any annual incentive bonus that would have been payable in the year of termination based on actual achievement of the applicable performance goals, paid in a lump sum at the time annual bonuses are normally paid.

Restrictive Covenants

The employment agreements with each of our named executive officers contain certain restrictive covenants for the benefit of the company. Pursuant to the terms of their employment agreements, each of Messrs. Gentilcore, Crews, Kolberg, and Biltz entered into a Confidentiality, Non-Competition, Non-Solicitation and Intellectual Property Agreement, which contains, among other provisions, a 24-month post-termination non-compete and non-solicitation covenant. Our employment agreements with Messrs. Randolph and Ferrall also contain 24-month post-termination non-compete and non-solicitation covenants, as well as a prohibition of disclosure of confidential information.

Equity Awards

Equity awards subject to time vesting will vest and, as applicable, become exercisable upon a change of control of the company. Equity awards subject to performance vesting based on the MOI Target will vest and, as applicable, become exercisable upon a change of control only if such change of control results in the MOI Target being satisfied. Upon a termination of the named executive officer's employment due to death, disability, retirement, without cause, or for good reason (if applicable), restricted stock awards subject to time vesting that would otherwise have vested in the two year period following termination of employment will vest on such termination of employment, and equity awards subject to performance vesting based on the MOI Target will vest, and as applicable, become exercisable, only if the MOI Target is satisfied on or before the six month anniversary of the termination of employment.

Pursuant to the terms of their respective offer letter, employment agreement or equity award agreement, as applicable, each of Messrs. Gentilcore, Crews, Randolph, Ferrall and Kolberg would have been entitled to the following severance payments and benefits in connection with a termination of his employment and/or the occurrence of a change in control on December 31, 2016. The amounts reflected in the first table for Mr. Biltz reflect the values of the severance payments and benefits he was entitled to receive in connection with his termination of employment in 2016.

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Termination without Cause or for Good Reason without a Change of Control				
Name	Severance Pay (\$ (1))	Benefits (\$ (2))	Equity Acceleration (\$ (3))	Total (\$)
James Gentilcore	3,300,000	29,749	957,230	4,286,979
Michael Crews	1,115,625	30,587	448,509	1,594,721
Scott Randolph	1,487,500	40,782	800,716	2,328,998
Paul Ferrall	1,487,500	40,244	800,716	2,328,998
Ray Kolberg	743,750	20,391	127,566	891,707
George Biltz(4)	3,474,101	40,782	2,203,925	5,718,808

Change of Control Only				
Name	Severance Pay (\$ (1))	Benefits (\$ (2))	Equity Acceleration (\$ (3))	Total (\$)
James Gentilcore	—	—	2,400,907	2,400,907
Michael Crews	—	—	1,496,665	1,496,665
Scott Randolph	—	—	1,484,485	1,484,485
Paul Ferrall	—	—	1,484,485	1,484,485
Ray Kolberg	—	—	499,935	499,935

Termination due to Death or Disability				
Name	Severance Pay (\$ (1))	Benefits (\$ (2))	Equity Acceleration (\$ (3))	Total (\$)
James Gentilcore	—	—	957,230	957,230
Michael Crews	—	—	448,509	448,509
Scott Randolph	—	—	800,716	800,716
Paul Ferrall	—	—	800,716	800,716
Ray Kolberg	—	—	127,566	127,566

Termination due to Retirement				
Name	Severance Pay (\$ (1))	Benefits (\$ (2))	Equity Acceleration (\$ (3))	Total (\$)
James Gentilcore	—	—	957,230	957,230
Michael Crews	—	—	448,509	448,509
Scott Randolph	—	—	800,716	800,716
Paul Ferrall	—	—	800,716	800,716
Ray Kolberg	—	—	127,566	127,566

- (1) Represents the cash severance amounts that would be payable as a result of the event described in the table above, based on the named executive officer's base salary and target bonus amount in effect as of December 31, 2016, as applicable, and without including any accrued but unpaid compensation, paid time-off or any bonus earned with respect to 2016 performance (pro rata or otherwise). The cash severance amounts that would be payable to each of our named executive officers in connection with a termination of employment under various circumstances is described in more detail above.
- (2) Represents the estimated value of the company paid portion of the premium for executive's medical and dental for the applicable period.
- (3) Reflects the accelerated vesting of any unvested stock options and restricted shares that would have vested upon termination or a change of control pursuant to the terms of the award agreements governing such unvested awards outstanding as of December 31, 2016, assuming a price per share of our Class A common stock of \$79.25 and our Class B common stock of \$192.99, which is the estimated fair market value as of December 31, 2016. No amounts have been included in respect of performance-based stock options or restricted shares since the MOI Target associated with such awards would not have been satisfied at these shares prices.

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- (4) Reflects the payments and benefits Mr. Biltz became entitled to in connection with his termination of employment pursuant to the terms of his severance agreement, as described above.

Director Compensation

The following table sets forth certain information with respect to cash compensation and stock awards granted to our directors in 2016. Directors who are employees of CCMP or INEOS do not receive compensation for their service on our board. Mr. Gentilcore did not receive any compensation for his service as a director. For information on the compensation that he received in his capacity as President and Chief Executive Officer, please see the Summary Compensation Table above.

Name	Fees Earned or Paid in Cash (\$)	Stock Awards(2) (3)	Option Awards (2)(3)	Non-Equity Incentive Plan Compensation (4)	All Other Compensation (\$)	Total (\$)
Michael Boyce	357,500(1)	357,588	1,269,434	451,976	525,082(5)	2,877,789
Christopher Behrens	—	—	—	—	—	—
Greg Brenneman	—	—	—	—	—	—
Bob Coxon	60,000	—	—	—	—	60,000
Andy Currie	—	—	—	—	—	—
Jonny Ginns	—	—	—	—	—	—
Mark McFadden	—	—	—	—	—	—
Robert Toth	—	—	—	—	—	—
Kyle Vann	50,000	—	101,622	—	35,320(6)	186,942
Timothy Walsh	—	—	—	—	—	—

- (1) Mr. Boyce receives compensation for his service as Chairman pursuant to an employment agreement, which expires on January 1, 2018, described below.
- (2) The amounts shown reflect the aggregate grant date fair value of stock and stock options granted in 2016, computed in accordance with ASC Topic 718, disregarding the effects of estimated forfeitures. These amounts reflect our cumulative accounting expense over the vesting period (in the case of stock options) and do not correspond to the actual value that may be realized by the directors. For information on the valuation assumptions made in the calculation of these amounts, refer to Note 21 to the audited consolidated financial statements of PQ Group Holdings Inc. and subsidiaries included elsewhere in this prospectus.
- (3) As of December 31, 2016, the following directors held outstanding stock options: Mr. Boyce, 43,134, and Mr. Vann, 3,452, and the following directors held outstanding restricted Class A shares: Mr. Boyce 48,090, and Mr. Coxon, 2,886.
- (4) Represents amounts paid to Mr. Boyce under the company's performance-based annual incentive plan, the PQIP. Pursuant to the terms of his employment agreement, as described below, Mr. Boyce's target annual bonus for 2016 was 100% of his 2016 base salary. The actual award payable for 2016 to Mr. Boyce was based on the achievement of the EBITDA targets for each of the company's four divisions pursuant to the same formula and based on the same financial targets and achievement levels under which Messrs. Gentilcore, Crews and Biltz earned their PQIP awards, all as discussed above under "Annual Performance-Based Cash Award – The PQIP".
- (5) Includes the company's matching contribution under the 401(k) plan (\$7,950), the company's 4% contribution under the 401(k) plan (\$10,600), the company's contribution to the PRA SERP (\$9,063), amounts in respect of tax preparation services (\$55,148) and an additional cash payment related to an exchange of equity in connection with a corporate reorganization tied to the merger of the company with Eco Services (\$442,321).
- (6) Represents an additional cash payment related to an exchange of equity in connection with a corporate reorganization tied to the merger of the company with Eco Services.

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Director Compensation

In 2016, each of our independent directors was paid an annual cash fee of \$50,000, paid in equal quarterly installments, for his service on our board of directors. Mr. Coxon received an extra \$10,000 retainer in respect of his position as chair of the Health, Safety and Environment Committee of our board of directors.

Mr. Vann received additional cash compensation as a result of an exchange of equity in connection with a corporate reorganization tied to the merger of the company with Eco Services and each of Messrs. Boyce and Vann received options to purchase Class A common stock in connection with this corporate reorganization. These options vest in equal installments on each of the first four anniversaries of the date of grant. Mr. Boyce also received a grant of fully vested Class B shares. Other than Mr. Boyce, we do not pay any additional remuneration for director service to any of our directors who are either our officers or who are employees of CCMP or employees of INEOS. However, all directors are reimbursed for reasonable travel and lodging expenses incurred to attend meetings of our board of directors or a committee thereof.

On August 15, 2017, the company granted to each of our two newly appointed directors, Mr. Craighead and Ms. Ross, 825 restricted Class B shares. Each award vests subject to the continued service of the director through the first anniversary of his or her appointment to our board of directors on July 13, 2017.

In connection with this offering we intend to adopt a non-employee director compensation policy that would set forth the compensation of our independent non-employee directors following this offering. Pursuant to such policy, it is currently expected that each of our non-employee directors who is not an employee of CCMP or INEOS would be compensated as follows:

- Each eligible non-employee director is expected to receive an annual cash retainer of \$50,000. The chairperson of the audit committee is expected to receive an additional annual cash retainer of \$20,000. The chairperson of each other committee, to the extent eligible for compensation under the policy, is expected to receive an additional annual cash retainer of \$15,000. Each annual retainer is expected to be paid quarterly in arrears.
- Each eligible non-employee director is expected to receive an annual equity grant in the form of restricted stock units with a grant date fair value of \$200,000. The terms of each such award will be set forth in a written award agreement between each director and us, which will generally provide for vesting after one year of continued service as a director or upon an earlier occurrence of a change in control.

All cash and equity awards granted under the non-employee director compensation policy will be granted under, and subject to the limits of, the 2017 Plan (described below).

Arrangement with Mr. Boyce

Mr. Boyce is party to an employment agreement with the company, dated January 1, 2013, which remains in effect following his resignation as our Chief Executive Officer in April 2015 and sets forth his compensation as the Chairman of our board of directors. The term of Mr. Boyce's employment agreement expires on January 1, 2018. Pursuant to his employment agreement, Mr. Boyce is entitled to receive an annual base salary of \$357,500, which is equal to 50% of the annual base salary he received at the time of his resignation as Chief Executive Officer, as well as an annual incentive bonus with a target of 100% of his annual base salary, based on the company's achievement of financial performance goals established by our board of directors or the Compensation Committee. As noted above, Mr. Boyce's annual base salary and target annual incentive bonus for 2016 were as provided in his employment agreement as negotiated in 2013, and have not been subsequently increased or changed. As a member of our board of directors, Mr. Boyce participates in the determination of the objective financial targets upon which payments under the PQIP are based, but Mr. Boyce does not otherwise participate in determining the level of compensation he is awarded. Mr. Boyce also remains eligible to participate

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in any employee benefit plans and programs maintained by the company, to the extent permitted under the applicable plans. Any equity awards he held at the time he ceased to be our Chief Executive Officer continue to vest based on his services as Chairman.

2016 Stock Incentive Plan

The PQ Group Holdings, Inc. Stock Incentive Plan (the “2016 Plan”) authorizes our Compensation Committee to grant options, stock appreciation rights, restricted shares, deferred stock units or other share based awards to selected employees. The 2016 Plan is administered by the Compensation Committee of the board of directors. The Compensation Committee determines the recipients of awards, the types of awards to be granted and the applicable terms, provisions, limitations and performance requirements of such awards. The Compensation Committee also has the authority to conclusively interpret the 2016 Plan and any award agreements under the plan.

The company has reserved 908,189 of our shares of Class A common stock for issuance pursuant to the 2016 Plan. The number of shares of Class B common stock that may be issued under the Plan will be determined by our board of directors from time to time. To the extent any award under the 2016 Plan is cancelled, terminated or forfeited, then the number of shares of common stock covered by the award so cancelled, terminated or forfeited will again be available for awards under the 2016 Plan. As of August 31, 2017, awards with respect to 866,739 shares of Class A common stock have been issued under the 2016 Plan.

The number of shares of common stock available for grants or subject to outstanding awards shall be proportionally adjusted in the event of any dividend payable in capital stock of the company, and any stock split, share combination, cash dividend, recapitalization, reorganization, merger, consolidation, split-up, spin-off, combination, exchange of shares or other similar event.

The Compensation Committee, in its sole discretion, may determine that an award will be immediately vested in whole or in part, or that all or any portion may not be vested until a date, or dates, subsequent to its grant date, or until the occurrence of one or more specified events, subject in any case to the terms of the 2016 Plan. The Compensation Committee may impose on any award such additional terms and conditions as the Compensation Committee determines, including terms requiring forfeiture of awards in the event of a participant’s termination of service. Unless otherwise determined by the Compensation Committee or unless substitute or alternative awards are provided for, upon a change in control, time-based awards granted under the 2016 Plan will vest in full.

The Compensation Committee generally may terminate, suspend or amend the 2016 Plan in a manner that does not adversely affect outstanding awards at any time. The 2016 Plan will expire on September 28, 2024, unless earlier terminated, and thereafter will continue to govern outstanding awards granted under it.

2017 Omnibus Incentive Plan

In connection with this offering, our board of directors intends to adopt the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan (the “2017 Plan”), and, following this offering, all equity-based awards will be granted under the 2017 Plan. The following summary describes what we anticipate will be the material terms of the 2017 Plan. This summary of the 2017 Plan is not a complete description of what we anticipate the provisions of the 2017 Plan to be and is qualified in its entirety by reference to the 2017 Plan, which will be filed as an exhibit to the registration statement of which this prospectus is a part.

Administration. The 2017 Plan will be administered by the Compensation Committee, or such other committee, which, to the extent deemed necessary by our board of directors, will be comprised of no fewer than two members of our board of directors, appointed by our board of directors, or our full board of directors (any of the foregoing, as applicable, the “Committee”). The Committee has the authority to, among other things, interpret the 2017 Plan and the terms of awards, determine eligibility, prescribe the restrictions, terms and conditions of all awards, determine the form of settlement of awards (whether in cash, shares of our common stock and/or other

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property), accelerate the vesting or exercisability of any award, and do all things necessary or appropriate to administer the 2017 Plan. The Committee's determinations under the 2017 Plan are final, conclusive, and binding. The Committee shall have the right to delegate to one or more of its members, members of our board of directors or officers of the company the authority of the Committee to grant and determine the terms and conditions of awards granted under the 2017 Plan, subject to applicable laws, and to any appropriate officer or employee the responsibility for performing certain ministerial functions under the 2017 Plan.

Eligibility. Employees, directors, consultants and personal service providers of the company and our subsidiaries are eligible to participate in the 2017 Plan. Eligibility for stock options intended to be incentive stock options ("ISOs") is limited to our employees.

Authorized shares. Subject to adjustment, as described below, the maximum number of shares of our common stock that are reserved for issuance under the 2017 Plan is _____ shares, plus any shares remaining available for grant under the PQ Group Holdings Inc. Stock Incentive Plan (the "SIP") at the time the 2017 Plan is approved. The maximum amount of shares of our common stock that may be issued in satisfaction of incentive stock options under the 2017 plan is _____ shares.

To the extent awards granted under the 2017 Plan expire, or are canceled, forfeited, settled in cash, settled by delivery of fewer shares than the number underlying the award, or are otherwise terminated without delivery of shares, or are withheld by us in payment of the exercise price, purchase price, or taxes relating to an award granted under the 2017 Plan, or are not issued or delivered as a result of the net settlement of an outstanding stock option or stock appreciation right ("SAR"), the shares retained by or returned to us, in each case, will not be deemed to have been delivered under the 2017 Plan, will be available for future awards under the 2017 Plan and will increase the number of shares reserved for issuance under the 2017 Plan by one share for each share that is retained or returned to us. In addition, any shares of that become available for issuance pursuant to the 2016 Plan as a result of the forfeiture, cancellation or termination for no consideration will not be available for future awards under the 2016 Plan, but will be available for future awards under the 2017 Plan and increase the number of shares reserved for issuance under the 2017 Plan by one share for each share that is retained or returned to us, subject to a maximum of _____ shares.

Individual limits. The maximum number of shares of our common stock subject to restricted stock awards and restricted stock units that, in each case, vest in full or in part based on the attainment of performance goals, stock options and SARs that may be granted to any participant (other than a non-employee director) in any calendar year is, in each case, _____ shares. The maximum number of shares of our common stock subject to restricted stock awards and restricted stock units that, in each case, vest in full or in part based on continued employment over a stated period of time, that may be granted to any participant (other than a non-employee director) in any calendar year is, in each case, _____ shares. The maximum number of shares of our common stock subject to stock awards that may be granted to any participant (other than a non-employee director) in any calendar year is _____ shares. The maximum amount that may become payable to any participant (including any non-employee director) under all cash awards in any calendar year is \$ _____. The foregoing limits are subject to adjustment as described below. If an award is settled in cash, the shares on which the award is based will count toward the annual cash limit and not the individual share limits described above (or below, in the case of non-employee directors).

Non-employee director limits. Subject to adjustment as described below, the maximum number of shares of our common stock subject to stock options, SARs, restricted stock awards, restricted stock units, and stock awards that may be granted to any non-employee director in any calendar year is _____ shares for all such award types in the aggregate.

Types of awards. The 2017 Plan provides for awards of stock options, SARs, restricted stock awards, restricted stock units, including performance stock units, cash awards and stock awards. Dividend equivalents

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may also be provided in connection with an award under the 2017 Plan on terms and subject to conditions established by the Committee.

- Stock options and SARs. SARs may be granted in tandem with a stock option or without any related stock option. The per share exercise price of a stock option, and the base price against which a SAR granted without any related stock option is to be measured, may not be less than the fair market value of a share of our common stock on the date of grant. The Committee may impose conditions on the time or times at which stock options or SARs become exercisable and the terms on which such awards remain exercisable and may provide that SARs are automatically payable upon a specified date or event.
- Restricted stock awards. A restricted stock award is an award of shares of our common stock subject to vesting and transfer restrictions.
- Restricted stock units. A restricted stock unit award is an unfunded and unsecured contractual right, denominated in shares of our common stock, which entitles the participant to receive shares of our common stock or cash measured by the value of shares of our common stock in the future.
- Performance stock unit. A performance stock unit is a restricted stock unit, paid or distributed based on or conditioned upon the attainment of pre-established business and/or individual performance goals.
- Cash awards. A cash award is an award denominated in cash, which may be payable based on or conditioned upon the attainment of pre-established business and/or individual performance goals.
- Stock awards. Stock awards are awards of shares of our common stock issued free of transfer restrictions and forfeiture conditions.

Performance awards. The 2017 Plan permits the grant of awards that are based upon, and subject to achieving, specified performance goals relating to performance criteria. Performance criteria with respect to those awards that are intended to qualify as “performance-based compensation” for purposes of Section 162(m) of the Code (“Section 162(m)”) consist of one or any combination of the following, for the company or any identified subsidiary or business unit (with associated performance goals applied on an absolute basis or relative to an identified index, peer group, or one or more competitors or other companies): (a) net earnings; (b) earnings per share; (c) net debt; (d) revenue or sales growth; (e) net or operating income; (f) net operating profit; (g) return measures (including, but not limited to, return on assets, capital, equity or sales); (h) cash flow (including, but not limited to, operating cash flow, distributable cash flow and free cash flow); (i) earnings before or after taxes, interest, depreciation, amortization and/or rent; (j) share price (including, but not limited to growth measures and total or relative stockholder return); (k) expense control or loss management; (l) customer satisfaction; (m) market share; (n) economic value added; (o) working capital; (p) the formation of joint ventures or the completion of other corporate transactions; (q) gross or net profit margins; (r) revenue mix; (s) operating efficiency; (t) product diversification; (u) market penetration; (v) measurable achievement in quality, operation or compliance initiatives; (w) quarterly dividends or distributions; (x) employee retention or turnover; or (y) any combination of or a specified increase in any of the foregoing.

We intend awards under the 2017 Plan to be exempt from the deduction limitations of Section 162(m) by reason of the post-initial public offering transition rule under Section 162(m) to the maximum extent possible.

Vesting. The Committee has the authority to determine the vesting terms and schedule applicable to each award, and to accelerate the vesting or exercisability of any award.

Termination of employment or service. The Committee will determine the effect of a termination of employment or service on an award. Unless otherwise determined by the Committee, all unvested awards will terminate upon a termination of employment or service, all awards will terminate upon a termination for cause, and participants will have a period of three months following termination to exercise any vested stock options (12 months in the case of a termination due to death or disability).

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Non-transferability of awards. Awards under the 2017 Plan may not be transferred other than by the laws of descent and distribution, unless, for awards other than ISOs, otherwise provided by the Committee.

Certain transactions; certain adjustments. In the event of a recapitalization, reclassification, stock dividend, extraordinary cash dividend, stock split, reverse stock split or other distribution with respect to shares of common stock or any merger, reorganization, consolidation, combination, spin-off, stock purchase or other similar corporate change or any other change affecting our common stock, the Committee will make appropriate adjustments to the maximum number and kind of shares of common stock that may be delivered under the 2017 Plan, the individual share limits described above, and will also make appropriate adjustments to the number and kind of shares, units, or other rights subject to outstanding awards, the exercise price or base price of such awards, the maximum amount payable under cash awards, or any other terms of awards affected by such change.

In the event of a change in control, unless otherwise provided in an award agreement, the Committee can make adjustments in the terms and conditions of outstanding awards, including: (a) continuation or assumption of outstanding awards, (b) substitution of awards with substantially the same terms for awards granted under the plan, (c) accelerated exercisability, vesting and/or payment under outstanding awards in connection with such transaction or a termination of employment following the transaction and (d) a cash payment in exchange for cancellation of awards or a requirement to exercise awards prior to such transaction, in the event of certain change in control transactions.

No Repricing. The repricing of stock options and SARs (other than in connection with certain corporate transactions) is prohibited without prior approval of the company's stockholders.

Recoupment. If the company is required to prepare an accounting restatement due to the material noncompliance of the Company, as a result of misconduct, with any financial reporting requirement under the securities laws, then any participant who is subject to automatic forfeiture under Section 304 of the Sarbanes-Oxley Act of 2002 will be required to reimburse the company for the amount of any awards received under the 2017 Plan in the 12-month period following the first public issuance or filing of the financial document required to be restated. The company may also recover awards and payments under any award in accordance with any applicable company clawback or forfeiture policy, as amended and in effect from time to time, or as otherwise required by applicable law or applicable stock exchange listing standards.

Amendment; termination. Our board of directors will be able to amend, modify, suspend, or terminate the 2017 Plan, except to the extent that such amendments, modification, suspension, or termination would adversely affect an award granted pursuant to the 2017 Plan without the participant's consent (except to comply with Section 162(m) or Section 422 of the Code). Our board of directors may seek shareholder approval for any amendment, modification, suspension or termination to the 2017 Plan in its discretion for purposes of compliance with Section 162(m) or Section 422 of the Code, stock exchange listing requirements or for any other purpose.

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Anticipated Awards under the 2017 Plan. In connection with this offering, we expect to grant options to purchase an aggregate of _____ shares of our common stock, and restricted stock unit awards relating to approximately _____ shares of our common stock to certain of our officers, employees and directors. The exercise price for such options will be the average of the high and low trading prices for a share of our common stock on the first day on which our common stock trades on the New York Stock Exchange. The expected grants for our named executive officers and directors are as follows:

<u>Name</u>	<u>Number of Securities Underlying Options</u>	<u>Number of Securities Underlying Restricted Stock Units</u>
<i>Named Executive Officers</i>		
James Gentilcore		
Michael Crews		
Scott Randolph		
Paul Ferrall		
<i>Directors</i>		

2017 PQ Corporation Incentive Plan

As described above, we provide our named executive officers with annual performance-based cash award opportunities linked to our annual financial performance under the PQIP. A description of the performance metrics and terms of the PQIP as it relates to 2017 is included in the Compensation Discussion and Analysis above under “*Annual Performance-Based Cash Award – The PQIP – Plan Structure for 2017.*”

CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

Consulting Agreements

CCMP Consulting Agreement

In December 2014, PQ Holdings and PQ Corporation entered into a consulting agreement with CCMP, pursuant to which CCMP agreed to provide PQ Holdings and its subsidiaries with certain financial advisory, consulting and other services in exchange for its pro rata portion of a \$1.25 million quarterly consulting fee to be shared with INEOS AG pursuant to the INEOS AG consulting agreement described below under “—INEOS Consulting Agreement,” and the reimbursement of reasonable out-of-pocket expenses incurred in connection with the performance of services under the agreement. The agreement also provides for payment to CCMP of a transaction fee to be shared on a pro rata basis with INEOS AG in connection with any merger, recapitalization, reorganization or other similar transaction in an amount calculated based on the total transaction value.

We paid advisory fee payments totaling \$5.8 million and \$1.1 million during the year ended December 31, 2016 and the six months ended June 30, 2017, respectively, and reimbursement payments totaling \$0.2 million during each of the years ended December 31, 2016 and 2015.

The consulting agreement provides for customary exculpation and indemnification provisions in favor of CCMP and its affiliates. The agreement is terminable by CCMP at any time upon 30 days prior written notice. In connection with this offering, the consulting agreement will be terminated in exchange for a payment to CCMP of accrued and unpaid fees in the amount of approximately \$ million. The indemnification and exculpation provisions in favor of CCMP and its affiliates will survive such termination.

INEOS Consulting Agreement

In December 2014, PQ Holdings and PQ Corporation entered into an amended and restated consulting agreement with INEOS AG, an affiliate of INEOS, pursuant to which INEOS AG agreed to provide PQ Holdings and its subsidiaries with certain financial advisory, consulting and other services in exchange for its pro rata portion of a \$1.25 million quarterly consulting fee to be shared with CCMP pursuant to the CCMP consulting agreement described above under “—CCMP Consulting Agreement,” and the reimbursement of reasonable out-of-pocket expenses incurred in connection with the performance of services under the agreement. The agreement also provides for payment to INEOS AG of a transaction fee to be shared on a pro rata basis with CCMP in connection with any merger, recapitalization, reorganization or other similar transaction in an amount calculated based on the total transaction value. The amended and restated consulting agreement with INEOS AG amended and restated the prior consulting agreement with INEOS Capital Partners, an affiliate of INEOS, which was entered into in July 2008 on substantially similar terms.

We paid advisory fees totaling \$2.2 million, \$2.3 million, \$2.5 million and \$1.1 million during the years ended December 31, 2016, 2015 and 2014 and the six months ended June 30, 2017, respectively.

The amended and restated consulting agreement provides for customary exculpation and indemnification provisions in favor of INEOS AG and its affiliates. The agreement is terminable by INEOS AG at any time upon 30 days prior written notice. In connection with this offering, the amended and restated consulting agreement will be terminated in exchange for a payment to INEOS AG of accrued and unpaid fees in the amount of approximately \$ million. The indemnification and exculpation provisions in favor of INEOS AG and its affiliates will survive such termination.

Amended and Restated Stockholders Agreement

In connection with the Business Combination, in May 2016, we entered into an amended and restated stockholders agreement with certain stockholders, including investments funds affiliated with CCMP, INEOS,

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our directors and officers who hold shares of our common stock and certain other investors relating to rights and obligations with respect to ownership of our common stock, including the designation of certain director nominees, certain corporate governance rights, drag along rights, tag along rights, preemptive rights, demand and piggyback registration rights and related lockup obligations. In connection with the consummation of this offering, we intend to further amend and restate the stockholders agreement. The stockholders agreement, as so further amended and restated, will provide affiliates of CCMP with certain demand registration rights, including shelf registration rights, following the expiration of the 180-day lockup period in respect of shares of our common stock held by them and will also provide that, in the event that we register additional shares of our common stock for sale to the public following completion of this offering, we will be required to give notice of such registration to such affiliates of CCMP and certain other stockholders, and, subject to certain limitations, include shares of our common stock held by them in such registration. In addition, we will be required to bear the registration expenses, other than underwriting discounts and commissions and transfer taxes, associated with any registration of shares described above and to indemnify such stockholders and certain other persons against certain liabilities that may arise under the Securities Act in connection with any such offering and sale of our shares.

Floating Rate Senior Unsecured Notes Investment

In connection with the offering by PQ Corporation of \$525.0 million aggregate principal amount of Floating Rate Senior Unsecured Notes due 2022 in May 2016, Andrew Currie, a member of our board of directors, purchased \$4 million in principal amount of such notes. Interest accrues on the notes at an annual rate equal to three-month LIBOR plus 10.75%, with a 1.0% LIBOR floor, payable and reset quarterly. Mr. Currie received interest payments in respect of the notes totaling \$0.3 million and \$0.2 million during the year ended December 31, 2016 and the six months ended June 30, 2017, respectively, and has not received any repayment in respect of the principal amount of such notes. We intend to redeem approximately \$ million in aggregate principal amount of the Floating Rate Senior Unsecured Notes with the net proceeds from this offering. As a result, Mr. Currie may receive a portion of the net proceeds from this offering. See “Use of Proceeds” and “Description of Certain Indebtedness—Floating Rate Senior Unsecured Notes due 2022.”

Advisory Services Agreement

In December 2014, Eco Services Group Holdings LLC, Eco Services Intermediate Holdings LLC and Eco (collectively, the “Eco Entities”) entered into an advisory services and monitoring agreement with CCMP and Boyce Eco Investment LLC (“Boyce Eco”). Certain of our executive officers are members of Boyce Eco. Pursuant to the terms of the agreement, the Eco Entities made a one-time payment of \$8 million and \$1.6 million to each of CCMP and Boyce Eco, respectively, in return for advisory services performed in connection with the 2014 Acquisition. Pursuant to a payment direction and subscription agreement, in lieu of the Eco Entities making the \$1.6 million payment to Boyce Eco, Boyce Eco agreed to contribute the \$1.6 million transaction fee to the capital of Eco Services Group Holdings LLC. Eco Services Group Holdings LLC contributed this fee to Eco Services Intermediate Holdings LLC, who in turn contributed the amount to Eco, increasing Eco’s additional paid-in capital by \$1.6 million.

In addition, CCMP agreed to provide the Eco Entities with certain financial advisory services in exchange for an annual consulting fee of \$0.5 million and the reimbursement of reasonable out-of-pocket expenses incurred in connection with the performance of services under the agreement. The agreement provided for customary exculpation and indemnification provisions in favor of CCMP, Boyce Eco and each of their respective affiliates. The agreement terminated pursuant to its terms in May 2016 in connection with the Business Combination. The indemnification and exculpation provisions in favor of CCMP, Boyce Eco and each of their respective affiliates survived such termination.

CCMP received consulting fees totaling \$0.3 million and \$0.5 million during the years ended December 31, 2016 and 2015, respectively.

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INEOS Silicas Purchase Agreement

In July 2008, PQ Corporation entered into a purchase agreement with certain affiliates of INEOS pursuant to which PQ Corporation acquired certain assets and liabilities from, and certain stock of, the entities that comprised INEOS Silicas. In connection with such acquisition, PQ Corporation agreed to make certain future payments to INEOS Silicas Limited, an affiliate of INEOS, in an amount based on PQ Corporation's U.K. taxable results. PQ Corporation paid INEOS Silicas Limited \$2.3 million, \$2.3 million, \$1.1 million and \$1.6 million during each of the years ended December 31, 2016, 2015 and 2014 and the six months ended June 30, 2017, respectively. INEOS Silicas Limited is entitled to additional payments totaling \$0.3 million in the future.

Related Party Transactions Policy

In connection with this offering, we will adopt a policy with respect to the review, approval and ratification of related party transactions. Under the policy, the nominating and corporate governance committee will be responsible for reviewing and approving related party transactions. The policy will apply to transactions, arrangements and relationships (including any indebtedness or guarantee of indebtedness) or any series of similar transactions, arrangements or relationships in which the aggregate amount involved will, or may be expected to, exceed \$120,000 with respect to any fiscal year, and where we (or one of our subsidiaries) are a participant and in which a related party has or will have a direct or indirect material interest. In the course of reviewing potential related party transactions, the nominating and corporate governance committee will consider the nature of the related party's interest in the transaction; the presence of standard prices, rates or charges or terms otherwise consistent with arms-length dealings with unrelated third parties; the materiality of the transaction to each party; the reasons for the company entering into the transaction with the related party; the potential effect of the transaction on the status of a director as an independent, outside or disinterested director or committee member; and any other factors the nominating and corporate governance committee may deem relevant.

PRINCIPAL STOCKHOLDERS

The following table shows information as of _____, 2017 regarding the beneficial ownership of our common stock (1) prior to this offering and (2) as adjusted to give effect to this offering by:

- each person or group who is known by us to own beneficially more than 5% of our common stock;
- each member of our board of directors and each of our named executive officers; and
- all members of our board of directors and our executive officers as a group.

Unless otherwise indicated below, the address for each listed director, officer and stockholder is c/o PQ Group Holdings Inc., 300 Lindenwood Drive, Valleybrooke Corporate Center, Malvern, Pennsylvania 19355. Beneficial ownership has been determined in accordance with the applicable rules and regulations promulgated under the Exchange Act. The information is not necessarily indicative of beneficial ownership for any other purpose. Under these rules, beneficial ownership includes any shares as to which the individual or entity has sole or shared voting or investment power and any shares as to which the individual or entity has the right to acquire beneficial ownership within 60 days after _____, 2017 through the exercise of any option, warrant or other right. For purposes of calculating each person's or group's percentage ownership, shares of common stock issuable pursuant to options exercisable within 60 days after _____, 2017 are included as outstanding and beneficially owned for that person or group but are not treated as outstanding for the purpose of computing the percentage ownership of any other person or group. The inclusion in the following table of those shares, however, does not constitute an admission that the named stockholder is a direct or indirect beneficial owner. To our knowledge, except under applicable community property laws or as otherwise indicated, the persons named in the table have sole voting and sole investment control with respect to all shares shown as beneficially owned. For more information regarding the terms of our common stock, see "Description of Capital Stock." For more information regarding our relationship with certain of the persons named below, see "Certain Relationships and Related Party Transactions."

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The numbers listed below are based on _____ shares of our common stock outstanding as of _____, 2017 after giving effect to the Reclassification as if it had occurred on that date. As of _____, 2017, prior to giving effect to the Reclassification, we had outstanding _____ shares of Class A common stock and _____ shares of Class B common stock. The actual number of shares of common stock to be issued to each holder of Class B common stock in the Reclassification is subject to change based on any changes to the initial public offering price. See “The Reclassification.”

Name of Beneficial Owner	Shares Owned Before this Offering		Shares Owned After this Offering (no option exercise)		Shares Owned After this Offering (full option exercise)	
	Number	Percentage	Number	Percentage	Number	Percentage
Beneficial owners of more than 5% of our common stock:						
CCMP Capital Investors III, L.P. and related investment funds ⁽¹⁾						
INEOS Investments Partnership ⁽²⁾						
Directors and Named Executive Officers:						
James F. Gentilcore ⁽³⁾						
Michael Boyce ⁽⁴⁾						
Greg Brenneman ⁽⁵⁾						
Timothy Walsh ⁽⁵⁾						
Christopher Behrens ⁽⁵⁾						
Mark McFadden ⁽⁵⁾						
Robert Toth ⁽⁵⁾						
Robert Coxon ⁽⁶⁾						
Andrew Currie ⁽⁷⁾						
Jonny Ginns						
Kyle Vann ⁽⁸⁾						
Martin S. Craighead ⁽⁹⁾						
Kimberly Ross ⁽¹⁰⁾						
Michael Crews ⁽¹¹⁾						
Scott Randolph ⁽¹²⁾						
Paul Ferrall ⁽¹³⁾						
Ray Kolberg ⁽¹⁴⁾						
George Biltz ⁽¹⁵⁾						
All executive officers and directors as a group (20 persons) ⁽¹⁶⁾						

* Indicates less than one percent.

(1) Includes _____ shares of our common stock held by CCMP Capital Investors III, L.P. (“CCMP Capital Investors”), _____ shares of our common stock held by CCMP Capital Investors III (Employee), L.P. (“CCMP Employee”), _____ shares of our common stock held by CCMP Capital Investors III (AV-7), L.P. (“CCMP AV-7”), _____ shares of our common stock held by CCMP Capital Investors III(AV-8), L.P. (“CCMP AV-8”), _____ shares of our common stock held by CCMP Capital Investors III (AV-9), L.P. (“CCMP AV-9”), _____ shares of our common stock held by CCMP Capital Investors III(AV-10), L.P. (“CCMP AV-10” and, together with CCMP Capital Investors, CCMP Employee, CCMP AV-7, CCMP AV-8 and CCMP AV-9, the “CCMP Capital Funds”) and _____ shares of our common stock held by Quartz Co-Invest, L.P. (“Quartz” and, together with the CCMP Capital Funds, the “CCMP Investors”). The general partner of the CCMP Capital Funds is CCMP Capital Associates III, L.P. (“CCMP Capital Associates”). The general partner of CCMP Capital Associates is CCMP Capital Associates III GP, LLC (“CCMP Capital Associates GP”). The general partner of Quartz is CCMP Co-Invest III A GP, LLC (“CCMP Co-Invest GP”). CCMP Capital Associates GP and CCMP Co-Invest GP are each wholly owned by CCMP Capital, LP. The general partner of CCMP Capital, LP is CCMP Capital GP, LLC (“CCMP Capital GP”). CCMP Capital GP ultimately exercises voting and investment power over the shares of our

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- common stock held by the CCMP Investors. As a result, CCMP Capital GP may be deemed to share beneficial ownership with respect to the shares of our common stock held by the CCMP Investors. The investment committee of CCMP Capital GP with respect to the shares of our common stock consists of Messrs. Behrens, Brenneman and Walsh, each of whom serves as a director of the company. Each of the CCMP entities has an address of c/o CCMP Capital Advisors, LP, 277 Park Avenue, New York, New York 10172.
- (2) The partners of INEOS Investments Partnership are James A. Ratcliffe, John Reece, Andrew Currie and INEOS Silicas Holdings Limited. Mr. Ratcliffe, as the majority owner of INEOS Investments Partnership, has the power to control the voting and disposition of the shares of our common stock held by INEOS Investments Partnership. The address of INEOS Investments Partnership is Avenue des Uttins, 3, CH-1180, Rolle Switzerland.
 - (3) Includes shares of our common stock held by Mr. Gentilcore that can be acquired upon the exercise of outstanding options and shares of our common stock and shares of our restricted common stock subject to vesting conditions held by a trust for which Mr. Gentilcore is the grantor.
 - (4) Includes shares of our common stock that can be acquired upon the exercise of outstanding options and shares of our common stock held by Boyce Eco Investments LLC and PQP II, LLC. Mr. Boyce exercises voting and investment power over the shares of our common stock held by Boyce Eco Investments LLC and PQP II, LLC. As a result, Mr. Boyce may be deemed to share beneficial ownership with respect to the shares of our common stock held by Boyce Eco Investments LLC and PQP II, LLC. We expect that each of Boyce Eco Investments LLC and PQP II, LLC will be dissolved in connection with this offering, which will result in the shares of our common stock held by such companies being distributed to the members of such companies.
 - (5) Does not include shares of our common stock held by the CCMP Investors. The address of each of Messrs. Behrens, Brenneman, McFadden, Toth and Walsh is c/o CCMP Capital Advisors, LP, 277 Park Avenue, New York, New York 10172.
 - (6) Includes shares of our restricted common stock subject to vesting conditions.
 - (7) Does not include shares of our common stock held by INEOS Investments Partnership.
 - (8) Includes shares of our common stock that can be acquired upon the exercise of outstanding options.
 - (9) Includes restricted stock awards in respect of shares of our common stock, which will vest, subject to continued service as a director, on July 13, 2018.
 - (10) Includes restricted stock awards in respect of shares of our common stock, which will vest, subject to continued service as a director, on July 13, 2018.
 - (11) Includes shares of our common stock that can be acquired upon the exercise of outstanding options and shares of our restricted common stock subject to vesting conditions held by Mr. Crews and shares of our common stock held by a revocable trust for which Mr. Crews is the grantor.
 - (12) Includes shares of our common stock that can be acquired upon the exercise of outstanding options and shares of our restricted common stock subject to vesting conditions.
 - (13) Includes shares of our common stock that can be acquired upon the exercise of outstanding options and shares of our restricted common stock subject to vesting conditions.
 - (14) Includes shares of our common stock that can be acquired upon the exercise of outstanding options and shares of our restricted common stock subject to vesting conditions.
 - (15) Includes shares of our common stock and shares of our restricted common stock subject to vesting conditions held by a trust for which Mr. Biltz is the grantor. Mr. Biltz stepped down as our President and Chief Executive Officer effective June 24, 2016 and terminated employment with us on July 31, 2016.
 - (16) Includes shares of our common stock that can be acquired upon the exercise of outstanding options and shares of our restricted common stock subject to vesting conditions.

DESCRIPTION OF CERTAIN INDEBTEDNESS

The following is a summary of certain of our indebtedness that is currently outstanding. The following descriptions do not purport to be complete and are qualified in their entirety by reference to the agreements and related documents referred to herein, copies of which have been filed as exhibits to the registration statement of which this prospectus forms a part, and may be obtained as described under “Where You Can Find More Information” in this prospectus.

Senior Secured Credit Facilities

Overview

In connection with the Business Combination, on May 4, 2016, PQ Corporation entered into (a) a \$200.0 million asset-based lending facility (the “ABL Facility”) with Citibank, N.A., as administrative agent and collateral agent (the “ABL Agent”), and the lenders from time to time party thereto and (b) a \$1,200.0 million term loan facility (the “Term Loan Facility”) and, together with the “ABL Facility,” the “Senior Secured Credit Facilities”) consisting of a U.S. dollar-denominated tranche in the amount of \$900.0 million and a Euro-denominated tranche in the amount of approximately \$300.0 million (or €265.0 million) with Credit Suisse AG, Cayman Island Branch, as administrative agent and collateral agent (the “Term Loan Agent”), and the lenders from time to time party thereto. On November 14, 2016, PQ Corporation entered into a repricing amendment to the Term Loan Facility, which increased the U.S. dollar-denominated tranche to a total amount of \$927.8 million and the Euro-denominated tranche to a total amount of €283.3 million. On August 7, 2017, PQ Corporation entered into a second repricing amendment to the Term Loan Facility to lower the applicable interest rate margin for each of the U.S. dollar-denominated tranche and the Euro-denominated tranche.

ABL Facility. The ABL Facility consists of a \$150.0 million U.S. revolving credit facility available in U.S. dollars and such other currencies acceptable to the revolving lenders (the “U.S. ABL Facility”), a \$10.0 million Canadian revolving credit facility available in Canadian dollars, U.S. dollars and such other currencies acceptable to the revolving lenders (the “Canadian ABL Facility”) and a \$40.0 million UK and Netherlands revolving credit facility available in Euros, Pounds Sterling, U.S. dollars and such other currencies acceptable to the revolving lenders (the “European ABL Facility”), in each case, providing for loans and letters of credit thereunder and subject to certain borrowing base limits. Proceeds from the ABL Facility are available to finance the working capital needs and other general corporate purposes of PQ Corporation and its subsidiaries, including investments, restricted payments and any other purpose not prohibited thereby. A portion of the ABL Facility not to exceed \$60 million is available for the issuance of letters of credit.

The ABL Facility provides the ABL Agent customary discretion to impose reserves or availability blocks, which could materially impair the amount of borrowings that would otherwise be available and may require repayment of certain amounts outstanding under the ABL Facility.

The ABL Facility provides that PQ Corporation may request increases to the ABL Facility in an aggregate principal amount not to exceed (w) the greater of (1) \$50 million and (2) the amount by which the borrowing base exceeds the aggregate commitments then outstanding, so long as the total net leverage ratio does not exceed 5.80:1.00 after giving pro forma effect to any such increase plus (x) in the case of any incremental facilities that serve to effectively replace any commitment under the ABL Facility that is terminated under the “yank-a-bank” provisions, an amount equal to the portion of the relevant terminated commitment plus (y) the amount of any permanent voluntary reduction of the commitments under the ABL Facility and/or any incremental revolving facility. The lenders are not obligated to provide such additional commitments, and any increase in commitments is subject to customary conditions precedent.

Additional borrowings under the ABL Facility will be subject to the satisfaction of customary conditions, including absence of events of default and availability.

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Term Loan Facility. The Term Loan Facility provides that PQ Corporation may (a) request increases to the Term Loan Facility and add one or more incremental term loan facilities and (b) add one or more incremental cash-flow revolving facilities and increase commitments under any then existing incremental cash-flow revolving facilities in an aggregate principal amount not to exceed (w) \$200 million less any other incremental borrowings incurred in reliance on that amount, plus (x) in the case of any incremental facilities that serve to effectively extend the maturity of any term loans or commitments or effectively replace any incremental cash-flow revolving facility, an amount equal to the reductions in the term loans or commitments to be replaced thereby or the terminated incremental cash-flow revolving facility, plus (y) the amount of certain voluntary prepayment of any term loans and any permanent reduction of the commitments under any incremental cash-flow revolving facility, plus (z) an unlimited amount so long as (1) if such incremental indebtedness is secured by a lien on the collateral on a *pari passu* basis with the Senior Secured Credit Facilities, we are in compliance on a pro forma basis with a senior secured net leverage ratio of no greater than 3.95:1.00, (2) if such incremental indebtedness is secured by a lien on the collateral by a lien that is junior to the lien securing the Senior Secured Credit Facilities, we are in compliance on a pro forma basis with a secured net leverage ratio of no greater than 4.70:1.00 or (3) if such incremental indebtedness is unsecured, we are in compliance on a pro forma basis with a total net leverage ratio of no greater than 5.80:1.00. The lenders are not obligated to provide such additional commitments, and the incurrence of any incremental indebtedness is subject to customary conditions precedent.

Interest rate and fees

ABL Facility: The interest rate applicable to loans under the ABL Facility denominated in (a) U.S. dollars is equal to an applicable interest rate margin, plus, at our option, either (1) a base rate determined by the reference to the highest of (A) the prime commercial lending rate publicly announced by the ABL Agent as the “prime rate” in effect on such day, (B) the federal funds effective rate, plus 0.50%, and (C) the one-month LIBOR rate determined by reference to the cost of funds for U.S. dollar deposits, plus 1.00%, or (2) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the specified interest period, as adjusted for certain statutory reserve requirements, (b) Canadian dollars is equal to an applicable interest rate margin, plus, at our option, either (1) the average rate applicable to Canadian dollar bankers’ acceptances (the “B/A Equivalent Rate”) or (2) the highest of (A) the prime commercial lending rate publicly announced by the ABL Agent in Canada as its “prime rate” as in effect on such day or (B) one-month B/A Equivalent Rate plus 1.0% per annum, or (c) Euros or Pounds Sterling is equal to an applicable interest rate margin, plus a LIBOR rate determined by reference to the costs of funds for the applicable currency deposits for the specified interest period, as adjusted for certain statutory reserve requirements.

A commitment fee is charged on the average daily unused portion of the ABL Facility, adjusted quarterly, of (a) 0.375% per annum if the average daily unused portion of the non-defaulting revolving lenders commitments is less than 50% or (b) 0.25% per annum if the average daily unused portion of the non-defaulting revolving lenders commitments is equal to or greater than 50%.

Term Loan Facility. Borrowings under the Term Loan Facility (x) denominated in U.S. dollars bear interest at a rate per annum equal to, at our option (1) a margin of 2.25% plus a base rate determined by reference to the highest of (A) the federal funds effective rate in effect on such day, plus 0.50%, (B) the one-month LIBOR rate determined by reference to the cost of funds for U.S. dollar deposits, plus 1.00%, (C) the prime commercial lending rate publicly announced by the Term Loan Agent as the “prime rate” in effect and (D) 2.00% (solely with respect to initial term loans) or (2) a margin of 3.25% plus a LIBOR rate (subject to a floor of 0%) determined by reference to the cost of funds for U.S. dollar deposits, as adjusted for certain statutory reserve requirements (or, if no interbank rate that is broadly accepted by the syndicated loan market exists, a successor or alternative index rate as the Term Loan Agent and PQ Corporation may determine with the consent of the required lenders under the Term Loan Facility), and (y) denominated in Euros bear interest at a rate per annum equal to, at our option (1) a margin of 2.25% plus a base rate determined by reference to the highest of (A) the federal funds effective rate in effect on such day plus, 0.50%, (B) the one-month LIBOR rate determined by reference to the cost of funds for Euro deposits, plus 1.00%, (C) the prime commercial lending rate publicly announced by the Term Loan Agent as the “prime rate” in effect and (D) 2.00% (solely with respect to initial term loans) or (2) a margin

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of 3.25% plus a EURIBOR rate (subject to a floor of 0.75%) determined by reference to the cost of funds for Euro deposits, as adjusted for certain statutory reserve requirements (or, if no interbank rate that is broadly accepted by the syndicated loan market exists, a successor or alternative index rate as the Term Loan Agent and PQ Corporation may determine with the consent of the required lenders under the Term Loan Facility).

Mandatory prepayments

ABL Facility. If at any time the aggregate amount of outstanding loans, unreimbursed letter of credit drawings and outstanding letters of credit under either the U.S. ABL Facility, the Canadian ABL Facility or the European ABL Facility exceeds the lesser of (i) the applicable commitment amount under such facility and (ii) the then applicable borrowing base for such facility, PQ Corporation must repay the outstanding loans under such facility (and cash collateralize outstanding letters of credit) in an aggregate amount equal to such excess. If at any time the aggregate amount of outstanding loans, unreimbursed letter of credit drawings and outstanding letters of credit under the ABL Facility exceeds the lesser of (i) the sum of all commitments under the ABL Facility and (ii) the then-applicable U.S. Borrowing Base plus the then-applicable Canadian Borrowing Base plus the then-applicable European Borrowing Base, PQ Corporation must repay the outstanding loans under such facility (and cash collateralize outstanding letters of credit) in an aggregate amount equal to such excess.

Term Loan Facility. The Term Loan Facility requires PQ Corporation to prepay, subject to certain exceptions, outstanding term loans with:

- 100% of net cash proceeds of any incurrence of debt, other than the net cash proceeds of certain debt permitted under the Term Loan Facility;
- 100% of net cash proceeds above a threshold amount of certain asset sales, subject to reinvestment rights and certain other exceptions; and
- 50% (subject to step-downs to 25% and 0% based upon pro forma senior secured net leverage ratio levels of 3.50:1.00 and 3.00:1.00, respectively) of our annual excess cash flow.

Voluntary prepayment

We may voluntarily reduce the unutilized portion of the commitment amount and repay outstanding loans under the Senior Secured Credit Facilities at any time without premium or penalty other than customary “breakage” costs with respect to LIBOR borrowings.

Amortization and final maturity

All outstanding revolving loans under the ABL Facility are due and payable in full upon the expiration of its five-year term. In the case of the term loans borrowed under the Term Loan Facility, PQ Corporation is required to make scheduled quarterly payments equal to 0.25% of the original principal amount of the term loans made on the closing date of the Business Combination, with the balance due on the 6.5 year anniversary of such closing date, which date may be accelerated to six months prior to the maturity date of the 8.5% Senior Notes (as defined below) unless the 8.5% Senior Notes have been refinanced or repaid prior to such time.

Guarantees and Security

All obligations under the Senior Secured Credit Facilities are unconditionally guaranteed jointly and severally on a senior basis by: (i) in the case of the Term Loan Facility, PQ Holdings, certain of PQ Corporation’s existing and future direct and indirect wholly-owned domestic subsidiaries (collectively, the “U.S. Guarantors”); (ii) in the case of the U.S. ABL Facility, the U.S. Guarantors (other than any such person in its capacity as a primary obligor in respect of the relevant obligation); (iii) in the case of the Canadian ABL Facility, by each of the Canadian ABL Facility borrower’s wholly-owned Canadian subsidiaries (subject to customary exceptions), PQ Corporation and the U.S. Guarantors; and (iv) in the case of the European ABL Facility, by each of the European ABL Facility borrower’s wholly-owned subsidiaries organized under the laws of the Netherlands or the United Kingdom (subject to customary exceptions), PQ Corporation and the U.S. Guarantors.

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All obligations under the Senior Secured Credit Facilities, and the guarantees of those obligations, are secured, subject to certain exceptions, by substantially all of the assets of the borrowers under each such facility and the assets of the respective guarantors under each such facility.

The assets securing the U.S. ABL Facility, the Canadian ABL Facility and the European ABL Facility (the “ABL Collateral”) include a first priority (subject to permitted liens and other exceptions) security interest in personal property consisting of accounts receivable, inventory, cash and cash equivalents (other than cash and cash equivalents constituting proceeds of Term Loan Collateral (as defined below), cash collateral subject to certain permitted liens or certain identifiable tax and trust funds), deposit accounts and securities accounts (other than any deposit account or securities account established solely to hold identified proceeds of Term Loan Collateral), and general intangibles, instruments, chattel paper, documents, commercial tort claims, letter of credit rights and supporting obligations related to the foregoing (other than capital stock and intellectual property), intellectual property to the extent attached to or necessary to sell the foregoing and books and records to the extent related to the foregoing, and, in each case, proceeds thereof, subject to customary exceptions.

The Term Loan Facility is secured by a second priority lien on and security interest in the ABL Collateral securing the U.S. ABL Facility.

The assets securing the Term Loan Facility (the “Term Loan Collateral”) include a first priority security interest (subject to permitted liens and other exceptions) on 100% of the present and future capital stock in PQ Corporation and the subsidiary guarantors’ direct subsidiaries (but limited in the case of the voting capital stock of any first-tier foreign subsidiary and any direct or indirect domestic subsidiary of which substantially all of its assets consist of the equity and/or debt of one or more direct or indirect foreign subsidiaries, to 65% of such capital stock), substantially all of PQ Corporation’s and the subsidiary guarantors’ material owned real property and equipment and all other personal property of PQ Corporation and the subsidiary guarantors to the extent not constituting collateral securing the ABL Facility on a first priority basis, including, without limitation, contracts (other than those relating to collateral securing the ABL Facility on a first priority basis), patents, copyrights, trademarks, other general intangibles, intercompany notes and proceeds of the foregoing, subject to customary exceptions.

The ABL Facility is secured by a second priority lien on and security interest in the Term Loan Collateral.

Certain Covenants and Events of Default

The Senior Secured Credit Facilities contain a number of restrictive covenants that, among other things and subject to certain exceptions, restrict the ability of PQ Corporation and the ability of its subsidiaries to:

- incur additional indebtedness;
- pay dividends on capital stock or redeem, repurchase or retire capital stock;
- make investments, acquisitions, loans and advances;
- create negative pledge or restrictions on the payment of dividends or payment of other amounts owed from subsidiaries;
- engage in transactions with affiliates;
- sell, transfer or otherwise dispose of assets, including capital stock of subsidiaries;
- materially alter the conduct of the business;
- modify certain material documents;
- change the fiscal year;
- consolidate, merge, liquidate or dissolve;

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- incur liens; and
- make prepayments of subordinated or junior debt.

PQ Holdings is also subject to a “passive holding company” covenant under the Senior Secured Credit Facilities.

In addition, the ABL Facility contains a financial covenant requiring PQ Corporation to maintain a 1.0:1.0 minimum trailing four quarter fixed charge coverage ratio, to be tested at any time that either (a) excess availability under the ABL Facility decreases to a level below the greater of 10% of the Line Cap (as defined below) and \$20 million or (b) availability under the U.S. ABL Facility is less than \$15 million, until the date on which (x) excess availability exceeds the greater of 10% of the Line Cap and \$20 million for 30 consecutive days and (y) availability under the U.S. ABL Facility for each day over a 30 consecutive day period has been equal to or greater than \$15 million. As used herein “Line Cap” means the lesser of (i) the aggregate commitments under the ABL Facility and (ii) the sum of the then-applicable U.S. borrowing base, the then-applicable Canadian borrowing base and the then-applicable European borrowing base.

The Senior Secured Credit Facilities also contain certain customary representations and warranties, affirmative covenants and reporting obligations. In addition, the lenders under the Senior Secured Credit Facilities are permitted to accelerate the loans and terminate commitments thereunder or exercise other specified remedies available to secured creditors upon the occurrence of certain events of default, subject to certain grace periods and exceptions, which include, among others, payment defaults, breaches of representations and warranties, covenant defaults, cross-defaults to certain material indebtedness, certain events of bankruptcy, certain events under the Employee Retirement Income Security Act of 1974, as amended, material judgments and changes of control.

6.75% Senior Secured Notes due 2022

Overview

In connection with the Business Combination, PQ Corporation issued \$625.0 million aggregate principal amount of 6.75% Senior Secured Notes due 2022 (the “6.75% Senior Secured Notes”). Interest on the 6.75% Senior Secured Notes is payable semi-annually on May 15 and November 15 of each year. The 6.75% Senior Secured Notes will mature and be due in full on November 15, 2022.

Guarantees and collateral

The 6.75% Senior Secured Notes are guaranteed, jointly and severally, on a senior secured basis by CPQ Midco I Corporation, the direct parent of PQ Corporation (“CPQ”), and on a senior unsecured basis by PQ Holdings, in each case to the extent such entities are guarantors under the Term Loan Facility. The 6.75% Senior Secured Notes are also guaranteed, jointly and severally, on a senior secured basis by each of PQ Corporation’s existing and future restricted subsidiaries that guarantee the Term Loan Facility, the Floating Rate Senior Unsecured Notes (as defined herein) and any existing and future domestic subsidiaries that guarantee any other indebtedness under any other syndicated bank or capital markets indebtedness of PQ Corporation or any restricted subsidiary in an aggregate principal amount in excess of \$50 million.

The 6.75% Senior Secured Notes and the related guarantees are secured, subject to certain permitted liens and exceptions, by: (i) a first-priority security interest in substantially all of PQ Corporation’s and the guarantors’ property and assets that secure the Term Loan Facility (other than collateral securing the ABL Facility on a first-priority basis) and (ii) a second-priority security interest in assets that constitute ABL Collateral. The liens securing the 6.75% Senior Secured Notes and the guarantees are *pari passu* with the liens securing the Term Loan Facility subject to the *pari passu* intercreditor agreement and subordinated to the liens securing the ABL Facility on a first-priority basis subject to the ABL Facility intercreditor agreement.

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Optional redemption

The 6.75% Senior Secured Notes are redeemable, in whole or in part, at the redemption prices (expressed as percentages of principal amount of 6.75% Senior Secured Notes to be redeemed) set forth below, plus accrued and unpaid interest, if any, to, but not including, the redemption date, if redeemed on or after any of the dates below until the subsequent date below:

<u>Year</u>	<u>Percentage</u>
May 15, 2019	103.375%
May 15, 2020	101.688%
May 15, 2021 and thereafter	100.000%

PQ Corporation may redeem up to 40% of the 6.75% Senior Secured Notes at any time prior to May 15, 2019 at a redemption price equal to 106.75% of the aggregate principal amount thereof, plus accrued and unpaid interest thereon, if any, to, but not including, the redemption date, with the net cash proceeds from certain equity offerings, including this offering. PQ Corporation may also redeem some or all of the 6.75% Senior Secured Notes at any time prior to May 15, 2019 at a redemption price equal to 100% of the principal amount thereof plus accrued and unpaid interest, if any, to, but not including, the redemption date, plus a “make whole” premium.

Change of control and asset sale offers

Upon the occurrence of certain events defined as constituting a change of control, each holder of 6.75% Senior Secured Notes has the right, subject to certain conditions, to cause PQ Corporation to repurchase all or any part of such holder’s 6.75% Senior Secured Notes at a purchase price in cash equal to 101% of the principal amount thereof, plus accrued and unpaid interest, if any, to the date of repurchase.

If PQ Corporation or its restricted subsidiaries engage in certain asset sales, PQ Corporation generally must invest the net cash proceeds from such sales in its business within a period of time, prepay certain debt or, when the excess proceeds from such asset sales exceed \$40 million, make an offer to purchase a principal amount of the outstanding 6.75% Senior Secured Notes equal to the excess net cash proceeds, subject to certain exceptions. The purchase price of the outstanding 6.75% Senior Secured Notes will be 100% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

Special mandatory offer to purchase

If, six months prior to November 1, 2022, any of the 8.5% Senior Notes remain outstanding, each holder of the 6.75% Senior Secured Notes has the right to require, subject to certain conditions, PQ Corporation to repurchase all or any part of such holder’s 6.75% Senior Secured Notes at a purchase price equal to 100% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

Certain covenants and events of default

The indenture governing the 6.75% Senior Secured Notes contains a number of negative covenants that, among other things and, subject to exceptions, restrict the ability of PQ Corporation and its restricted subsidiaries to:

- create, incur, issue, assume or otherwise become directly or indirectly liable for additional indebtedness (including guarantees thereof);
- incur liens on assets;
- pay dividends or certain other distributions on capital stock or repurchase capital stock or prepay subordinated indebtedness;
- make certain investments;

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- allow certain restrictions on the ability of PQ Corporation's restricted subsidiaries to pay dividends or make other payments to PQ Corporation or any of its restricted subsidiaries;
- engage in transactions with affiliates; and
- sell certain assets or merge or consolidate with or into other companies.

If the 6.75% Senior Secured Notes have an investment grade rating from Moody's and S&P, and no default exists under the indenture governing the 6.75% Senior Secured Notes, PQ Corporation and its restricted subsidiaries will not be subject to certain of the covenants listed above.

The indenture governing the 6.75% Senior Secured Notes also contains certain customary affirmative covenants and events of default.

Floating Rate Senior Unsecured Notes due 2022

Overview

In connection with the Business Combination, PQ Corporation issued \$525.0 million aggregate principal amount of Floating Rate Senior Unsecured Notes due 2022 (the "Floating Rate Senior Unsecured Notes") concurrent with the issuance of the 6.75% Senior Secured Notes. The Floating Rate Senior Unsecured Notes bear interest at an annual rate equal to three-month LIBOR plus 10.75%, with a 1% LIBOR floor, payable and reset quarterly on March 15, June 15, September 15 and December 15 of each year. The Floating Rate Senior Unsecured Notes will mature on May 1, 2022, provided that if the 8.5% Senior Notes have been refinanced or otherwise repaid prior to such date, the Floating Rate Senior Unsecured Notes will instead mature on May 1, 2023.

Guarantees

The Floating Rate Senior Unsecured Notes are guaranteed, jointly and severally, on an unsecured basis, by (i) PQ Holdings, CPQ and each restricted subsidiary of PQ Corporation that from time to time guarantees indebtedness in respect of the Senior Secured Credit Facilities (other than any foreign subsidiary guaranteeing foreign subsidiary obligations thereunder), the 8.5% Senior Notes or the 6.75% Senior Secured Notes and (ii) each restricted subsidiary of PQ Corporation that guarantees any other indebtedness under any other syndicated bank or capital markets indebtedness of PQ Corporation in an aggregate principal amount in excess of \$50 million.

Optional redemption

The Floating Rate Senior Unsecured Notes are redeemable, in whole or in part, at the redemption prices (expressed as percentages of principal amount of Floating Rate Senior Unsecured Notes to be redeemed) set forth below, plus accrued and unpaid interest thereon as of the date of prepayment, if redeemed on or after any of the dates below until the subsequent date below:

<u>Year</u>	<u>Percentage</u>
May 4, 2018	106.000%
May 4, 2019	103.000%
May 4, 2020	101.000%
May 4, 2021 and thereafter	100.000%

PQ Corporation may redeem up to 50% of the Floating Rate Senior Unsecured Notes at any time prior to May 4, 2018 at a redemption price equal to 106% of the principal amount of Floating Rate Senior Unsecured Notes redeemed, plus accrued and unpaid interest, if any, to the redemption date, with the net proceeds from

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certain equity offerings, including this offering. PQ Corporation may also redeem some or all of the Floating Rate Senior Unsecured Notes at any time prior to May 4, 2018 at a redemption price equal to 100% of the principal amount thereof, plus accrued and unpaid interest as of the date of prepayment, plus a “make whole” premium.

Change of control and asset sale offers

Upon the occurrence of certain events defined as constituting a change of control, each holder has the right, subject to certain conditions, to cause PQ Corporation to repurchase the Floating Rate Senior Unsecured Notes at the purchase prices (expressed as percentages of principal amount of Floating Rate Senior Unsecured Notes to be repurchased) set forth below, plus accrued and unpaid interest thereon as of the date of repurchase, if the change of control event occurs on or after any of the dates below until the subsequent date below:

<u>Year</u>	<u>Percentage</u>
May 4, 2018	106.000%
May 4, 2019	103.000%
May 4, 2020	101.000%
May 4, 2021 and thereafter	100.000%

Upon the occurrence of certain events defined as constituting a change of control at any time prior to May 4, 2018, PQ Corporation would be required to repurchase the Floating Rate Senior Unsecured Notes at a purchase price equal to 100% of the principal amount thereof, plus accrued and unpaid interest as of the date of repurchase, plus a “make whole” premium. If PQ Corporation or its restricted subsidiaries engage in certain asset sales, PQ Corporation generally must invest the net cash proceeds from such sales in its business within a period of time, prepay certain debt or, when the excess proceeds from such asset sales exceed \$40 million in the aggregate, make an offer to purchase a principal amount of the outstanding Floating Rate Senior Unsecured Notes equal to the excess net cash proceeds, subject to certain exceptions. The purchase price of the outstanding Floating Rate Senior Unsecured Notes will be 100% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

Certain covenants and events of default

The notes purchase agreement governing the Floating Rate Senior Unsecured Notes contains a number of negative covenants that, among other things and, subject to exceptions, restrict the ability of PQ Corporation and its restricted subsidiaries to:

- create, incur, issue, assume or otherwise become directly or indirectly liable with respect to any additional indebtedness (including guarantees thereof);
- incur liens on assets;
- pay dividends or certain other distributions on equity interests or repurchase equity interests or prepay subordinated indebtedness;
- make certain investments or other restricted payments;
- allow certain restrictions on the ability of our restricted subsidiaries to pay dividends, make other payments to us or sell or transfer assets;
- engage in transactions with affiliates; and
- sell certain assets or merge or consolidate with or into other companies.

The notes purchase agreement governing the Floating Rate Senior Unsecured Notes also contains certain customary affirmative covenants and events of default.

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8.5% Senior Notes due 2022

Overview

In October 2014, Eco, together with Eco Finance Corp., issued \$200.0 million aggregate principal amount of 8.5% Senior Notes due 2022 (the “8.5% Senior Notes”). Interest on the 8.5% Senior Notes is payable semi-annually on May 1 and November 1 of each year. The 8.5% Senior Notes will mature and be due in full on November 1, 2022.

In connection with the Business Combination, PQ Corporation assumed all of the obligations of Eco and Eco Finance Corp. under the 8.5% Senior Notes and the related indenture.

Guarantees

The 8.5% Senior Notes are guaranteed, jointly and severally, by PQ Holdings, CPQ and each of PQ Corporation’s existing and future domestic subsidiaries, in each case to the extent such entities are guarantors under the Senior Secured Credit Facilities.

Optional redemption

The 8.5% Senior Notes are redeemable, in whole or in part, at the redemption prices (expressed as percentages of principal amount of 8.5% Senior Notes to be redeemed) set forth below, plus accrued and unpaid interest thereon, if any, to, but not including, the redemption date, if redeemed on or after any of the dates below until the subsequent date below:

<u>Year</u>	<u>Percentage</u>
November 1, 2017	104.250%
November 1, 2018	102.125%
November 1, 2019 and thereafter	100.000%

PQ Corporation may redeem up to 40% of the 8.5% Senior Notes at any time prior to November 1, 2017 at a redemption price equal to 108.5% of the aggregate principal amount thereof, plus accrued and unpaid interest thereon, if any, to, but not including, the redemption date, with the net cash proceeds from certain equity offerings, including this offering. PQ Corporation may also redeem some or all of the 8.5% Senior Notes at any time prior to November 1, 2017 at a redemption price equal to 100% of the principal amount thereof plus accrued and unpaid interest, if any, to, but not including, the redemption date, plus a “make whole” premium.

Change of control and asset sale offers

Upon the occurrence of certain events defined as constituting a change of control, each holder of 8.5% Senior Notes has the right, subject to certain conditions, to cause PQ Corporation to repurchase all or any part of such holder’s 8.5% Senior Notes at a purchase price in cash equal to 101% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

If PQ Corporation or its restricted subsidiaries engage in certain asset sales, PQ Corporation generally must invest the net cash proceeds from such sales in its business within a period of time, prepay certain debt or, when the excess proceeds from such asset sales exceed \$25 million, make an offer to purchase a principal amount of the outstanding 8.5% Senior Notes equal to the excess net cash proceeds, subject to certain exceptions. The purchase price of the outstanding 8.5% Senior Notes will be 100% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

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Certain covenants

The indenture governing the 8.5% Senior Notes contains a number of negative covenants that, among other things and, subject to exceptions, restrict the ability of PQ Corporation and its restricted subsidiaries to:

- create, incur, issue, assume or otherwise become directly or indirectly liable for additional indebtedness (including guarantees thereof);
- incur liens on assets;
- pay dividends or certain other distributions on equity interests or repurchase equity interests or prepay subordinated indebtedness;
- make certain investments;
- allow certain restrictions on the ability of PQ Corporation's restricted subsidiaries to pay dividends or make other payments to PQ Corporation or any of its restricted subsidiaries;
- engage in transactions with affiliates; and
- sell certain assets or merge or consolidate with or into other companies.

If the 8.5% Senior Notes have an investment grade rating from Moody's and S&P, and no default exists under the indenture governing the 8.5% Senior Notes, PQ Corporation and its restricted subsidiaries will not be subject to certain of the covenants listed above.

The indenture governing the 8.5% Senior Notes also contains certain customary affirmative covenants and events of default.

New Markets Tax Credits Financing

We have entered into four separate NMTC financing arrangements to fund the expansion of manufacturing facilities in Paris, Texas and Augusta, Georgia. The NMTC program, which is administered by the United States Treasury Department, requires certain balance sheet commitments. The NMTC financing arrangements will provide the company with certain monetary benefits as an offset to specifically identified capital expenditures. The NMTC arrangements require that certain commitments and covenants be maintained over the course of seven years of the closing of the transaction in order to recognize the benefit.

On October 24, 2013, Potters Industries, LLC ("Potters") entered into an NMTC financing arrangement with JPMorgan Chase Bank N.A. and several of its affiliates ("Chase"), and TX CDE V LLC, an affiliate of Texas LIC Development Company LLC d/b/a Texas Community Development Capital ("TX CDE"), whereby Chase agreed to contribute \$6.6 million and an additional \$15.6 million in funds lent to Chase by Potters Holdings II, L.P. to TX CDE. TX CDE, in turn, lent \$21.0 million in the form of \$5.4 million and \$15.6 million notes, or the Loans, to Potters, which used the proceeds of the notes to finance the expansion of Potters' manufacturing facility in Paris, Texas. The full \$21.0 million remained outstanding as of June 30, 2017. The capital expenditures associated with the NMTC financing arrangement were completed in 2014.

On May 17, 2016, Potters entered into an NMTC financing arrangement with U.S. Bank N.A. and several of its affiliates ("USB") and MRC XX, LLC, an affiliate of Midwest Renewable Capital, LLC ("MRC XX"), whereby USB agreed to contribute \$3.7 million and an additional \$7.8 million in funds lent to USB by Potters Holdings II, L.P. to MRC XX. MRC XX, in turn, lent \$11.0 million in the form of \$7.8 million, \$1.3 million and \$1.9 million notes, to Potters, which used the proceeds of the notes as working capital and to finance the expansion of Potters' manufacturing facility in Augusta, Georgia. The full \$11.0 million remained outstanding as of June 30, 2017. The capital expenditures and working capital associated with the NMTC financing arrangement were completed in 2017.

On December 29, 2016, Potters entered into another NMTC financing arrangement with USB and MRC XXI, LLC, an affiliate of Midwest Renewable Capital, LLC ("MRC XXI"), whereby USB agreed to

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contribute \$3.8 million and an additional \$7.8 million in funds lent to USB by Potters Holdings II, L.P. to MRC XXI. MRC XXI, in turn, lent \$11.0 million in the form of \$7.8 million, \$1.4 million and \$1.8 million notes, to Potters, which will use the proceeds of the Loans as working capital for another expansion of Potters' manufacturing facility in Paris, Texas. The full \$11.0 million remained outstanding as of June 30, 2017. Potters expects to expend the proceeds of the notes as working capital in 2017.

On June 22, 2017, Potters entered into an NMTC financing arrangement with USB and Business Conduit No. 28, LLC, an affiliate of Community Reinvestment Fund, Inc. ("CRF"), whereby USB agreed to contribute \$3.1 million and an additional \$6.2 million in funds lent to USB by Potters Leveraged Lender LLC to CRF. CRF, in turn, lent \$8.8 million in the form of \$6.2 million and \$2.6 million notes to Potters, which used the proceeds to acquire equipment for the expansion of Potters' manufacturing facility in Paris, Texas. The full \$8.8 million remained outstanding as of June 30, 2017. The capital expenditures associated with the NMTC financing arrangement are expected to be completed in 2017.

DESCRIPTION OF CAPITAL STOCK

General

Upon the closing of this offering, the total amount of our authorized capital stock will consist of _____ shares of common stock, par value \$0.01 per share and _____ shares of undesignated preferred stock. As of June 30, 2017, we had outstanding 625,172 shares of Class A common stock and 6,711,756 shares of Class B common stock. In connection with the Reclassification, all of the outstanding Class A common stock and Class B common stock was reclassified into _____ shares of common stock. See “The Reclassification.” As of June 30, 2017, we had 103 stockholders of record of Class A common stock and 66 stockholders of record of Class B common stock and had outstanding options to purchase 248,900 shares of Class A common stock, which options were exercisable at a weighted average exercise price of \$72.01 per share.

After giving effect to this offering, we will have _____ shares of common stock and no shares of preferred stock outstanding. The following summary describes all material provisions of our capital stock. We urge you to read our certificate of incorporation and our bylaws, which are included as exhibits to the registration statement of which this prospectus forms a part.

Our certificate of incorporation and bylaws will contain provisions that are intended to enhance the likelihood of continuity and stability in the composition of the board of directors and which may have the effect of delaying, deferring or preventing a future takeover or change in control of our company unless such takeover or change in control is approved by our board of directors. These provisions include a classified board of directors, elimination of the ability of stockholders to call special meetings, advance notice procedures for stockholder proposals and the ability of our board of directors to issue preferred stock without stockholder approval that could be used to dilute a potential hostile acquiror.

Common Stock

Dividend Rights. Subject to preferences that may apply to shares of preferred stock outstanding at the time, holders of outstanding shares of our common stock will be entitled to receive dividends out of assets legally available at the times and in the amounts as the board of directors may from time to time determine.

Voting Rights. Each outstanding share of our common stock will be entitled to one vote on all matters submitted to a vote of stockholders. Holders of shares of our common stock shall have no cumulative voting rights.

Except as otherwise required under the Delaware General Corporation Law or provided for in our certificate of incorporation, all matters other than the election of directors will be determined by a majority of the votes cast on the matter and all elections of directors will be determined by a plurality of the votes cast. However, we have implemented a Majority Voting Policy for uncontested director elections (elections in which the number of nominees for election does not exceed the number of directors to be elected). In the event that the votes “withheld” from a nominee’s election exceed the votes cast “for” that nominee’s election, such nominee shall be required to submit his or her resignation to the board of directors for consideration. The board of directors will then have the opportunity to determine whether to accept or reject such tendered resignation. The board of directors, in making its decision, may consider any factors or other information that it considers appropriate or relevant.

The board of directors will act within 120 days following certification of the shareholder vote. Thereafter, the board of directors will promptly publicly disclose, in a report furnished to the SEC, its decision regarding the tendered resignation, including its rationale for accepting or rejecting the tendered resignation. The board of directors may accept a director’s resignation or reject the resignation. If the board of directors accepts a director’s resignation, or if a nominee for director is not elected and the nominee is not an incumbent director, then the board of directors, in its sole discretion, may fill any resulting vacancy or may decrease the size of the board of

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directors, in each case pursuant to our bylaws. If a director's resignation is not accepted by the board of directors, such director will continue to serve until the next annual meeting of shareholders when such director's class is up for re-election and until his or her successor is duly elected, or his or her earlier resignation or removal.

Preemptive Rights. Our common stock will not be entitled to preemptive or other similar subscription rights to purchase any of our securities.

Conversion or Redemption Rights. Our common stock will not have any conversion rights and there will be no redemption or sinking fund provisions applicable to our common stock.

Liquidation Rights. Upon our liquidation, the holders of our common stock will be entitled to receive pro rata our assets that are legally available for distribution, after payment of all debts and other liabilities and subject to the prior rights of any holders of preferred stock then outstanding.

Stock Exchange Listing. We have applied to list our common stock on the New York Stock Exchange under the symbol "PQG."

Preferred Stock

Our board of directors may, without further action by our stockholders, from time to time, direct the issuance of shares of preferred stock in series and may, at the time of issuance, determine the designations, powers, preferences, privileges, and relative participating, optional or special rights as well as the qualifications, limitations or restrictions thereof, including dividend rights, conversion rights, voting rights, terms of redemption and liquidation preferences, any or all of which may be greater than the rights of the common stock. Satisfaction of any dividend preferences of outstanding shares of preferred stock would reduce the amount of funds available for the payment of dividends on shares of our common stock. Holders of shares of preferred stock may be entitled to receive a preference payment in the event of our liquidation before any payment is made to the holders of shares of our common stock. Under certain circumstances, the issuance of shares of preferred stock may render more difficult or tend to discourage a merger, tender offer or proxy contest, the assumption of control by a holder of a large block of our securities or the removal of incumbent management. Upon the affirmative vote of a majority of the total number of directors then in office, our board of directors, without stockholder approval, may issue shares of preferred stock with voting and conversion rights which could adversely affect the holders of shares of our common stock and the market value of our common stock. Upon consummation of this offering, there will be no shares of preferred stock outstanding, and we have no present intention to issue any shares of preferred stock.

Anti-Takeover Effects of our Certificate of Incorporation and Bylaws

Our certificate of incorporation and bylaws will contain certain provisions that are intended to enhance the likelihood of continuity and stability in the composition of the board of directors and which may have the effect of delaying, deferring or preventing a future takeover or change in control of the company unless such takeover or change in control is approved by the board of directors.

These provisions include:

Classified Board. Our certificate of incorporation will provide that our board of directors will be divided into three classes of directors, with the classes as nearly equal in number as possible. As a result, approximately one-third of our board of directors will be elected each year. The classification of directors will have the effect of making it more difficult for stockholders to change the composition of our board. Our certificate of incorporation will also provide that, subject to any rights of holders of preferred stock to elect additional directors under specified circumstances, the number of directors will be fixed exclusively pursuant to a resolution adopted by our board of directors. Upon completion of this offering, our board of directors will have _____ members.

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Special Meetings of Stockholders. Our certificate of incorporation and bylaws will provide that, except as otherwise required by law, special meetings of the stockholders can only be called by the chairman of the board or pursuant to a resolution adopted by a majority of the board of directors. Except as otherwise required by law, stockholders will not be permitted to call a special meeting or to require the board of directors to call a special meeting.

Removal of Directors. Our certificate of incorporation will provide that our directors may be removed only for cause by the affirmative vote of at least a majority of the voting power of our outstanding shares of capital stock entitled to vote generally in the election of directors, voting together as a single class.

Advance Notice Procedures. Our bylaws will establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to the board of directors. Stockholders at an annual meeting will only be able to consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of the board of directors or by a stockholder who was a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has given our Secretary timely written notice, in proper form, of the stockholder's intention to bring that business before the meeting. Although the bylaws will not give the board of directors the power to approve or disapprove stockholder nominations of candidates or proposals regarding other business to be conducted at a special or annual meeting, the bylaws may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquiror from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempting to obtain control of the company.

Authorized but Unissued Shares. Our authorized but unissued shares of common stock and preferred stock will be available for future issuance without stockholder approval. These additional shares may be utilized for a variety of corporate purposes, including future public offerings to raise additional capital, corporate acquisitions and employee benefit plans. The existence of authorized but unissued shares of common stock and preferred stock could render more difficult or discourage an attempt to obtain control of a majority of our common stock by means of a proxy contest, tender offer, merger or otherwise.

Business Combinations with Interested Stockholders. We have elected in our certificate of incorporation not to be subject to Section 203 of the Delaware General Corporation Law, an antitakeover law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a business combination, such as a merger, with a person or group owning 15% or more of the corporation's voting stock for a period of three years following the date the person became an interested stockholder, unless (with certain exceptions) the business combination or the transaction in which the person became an interested stockholder is approved in a prescribed manner. Accordingly, we are not subject to any anti-takeover effects of Section 203. However, our certificate of incorporation will contain provisions that have the same effect as Section 203, except that they provide that INEOS and investment funds affiliated with CCMP, and certain of their respective transferees and affiliates will not be deemed to be "interested stockholders," regardless of the percentage of our voting stock owned by them, and accordingly will not be subject to such restrictions.

Exclusive Forum. Our certificate of incorporation will provide that, subject to limited exceptions, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (iii) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our bylaws, or (iv) any other action asserting a claim against us that is governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our certificate of incorporation described above. Although we believe these provisions benefit us by providing increased consistency in the application of Delaware law for the specified types of actions and proceedings, the provisions may have the effect of

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discouraging lawsuits against our directors and officers. The enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with one or more actions or proceedings described above, a court could find the choice of forum provisions contained in our certificate of incorporation to be inapplicable or unenforceable.

Corporate Opportunities

Our certificate of incorporation will provide that we renounce any interest or expectancy of the company in the business opportunities of CCMP and INEOS and of their respective officers, directors, agents, stockholders, members, partners, affiliates and subsidiaries and each such party shall not have any obligation to offer us those opportunities.

Limitations on Liability and Indemnification of Officers and Directors

Our certificate of incorporation will limit the liability of our directors to the fullest extent permitted by the Delaware General Corporation Law or any other law of the state of Delaware and our bylaws will provide that we may indemnify our directors and our officers that are appointed by the board of directors to the fullest extent permitted by applicable law. We expect to enter into indemnification agreements with our current directors and executive officers prior to the completion of this offering and expect to enter into a similar agreement with any new directors or executive officers. We expect to increase our directors' and officers' liability insurance coverage prior to the completion of this offering.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock will be American Stock Transfer and Trust Company, LLC. Its address is 6201 15th Avenue, Brooklyn, NY 11219. Its telephone number is (800) 937-5449.

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SHARES ELIGIBLE FOR FUTURE SALE

Immediately prior to this offering, there was no public market for our common stock, and we cannot predict what effect, if any, market sales of shares of our common stock or the availability of shares of our common stock for sale will have on the market price of our common stock prevailing from time to time. Nevertheless, sales of substantial amounts of our common stock in the public market, or the perception that such sales could occur, could materially and adversely affect the market price of our common stock and could impair our future ability to raise capital through the sale of our equity or equity-related securities at a time and price that we deem appropriate.

Upon the consummation of this offering, we will have outstanding an aggregate of approximately _____ shares of common stock. Of the outstanding shares, the shares sold in this offering will be freely tradable without restriction or further registration under the Securities Act, except any shares purchased by our “affiliates,” as that term is defined in Rule 144 under the Securities Act, may be sold only in compliance with the limitations described below. The remaining outstanding shares of common stock will be deemed restricted securities, as defined under Rule 144. Restricted securities may be sold in the public market only if registered or if they qualify for an exemption from registration under Rules 144 or 701 under the Securities Act, which we summarize below. Approximately _____ of these shares will be subject to lock-up agreements described below.

Taking into account the lock-up agreements described below, and assuming Morgan Stanley & Co. LLC and Goldman Sachs & Co. LLC do not release stockholders from these agreements, the following shares will be eligible for sale in the public market at the following times, subject to the provisions of Rule 144 and Rule 701:

Date Available for Resale	Shares Eligible For Sale	Comment
On the date of this offering (_____, 2017)		Shares eligible for sale under Rule 144 and Rule 701
180 days after the date of this offering (_____, 2018)		Lock-up released, shares eligible for sale under Rule 144 (subject, in some instances, to volume limitations) and Rule 701

Rule 144

In general, under Rule 144, beginning 90 days after the date of this prospectus, a person who is not our affiliate and has not been our affiliate at any time during the preceding three months will be entitled to sell any shares of our common stock that such person has beneficially owned for at least six months, including the holding period of any prior owner other than one of our affiliates, without regard to volume limitations. Sales of our common stock by any such person would be subject to the availability of current public information about us if the shares to be sold were beneficially owned by such person for less than one year.

Approximately _____ shares of our common stock that are not subject to the lock-up agreements described below will be eligible for sale under Rule 144 immediately upon the consummation of this offering.

Beginning 90 days after the date of this prospectus, our affiliates who have beneficially owned shares of our common stock for at least six months, including the holding period of any prior owner other than one of our affiliates, would be entitled to sell within any three-month period a number of shares that does not exceed the greater of:

- 1% of the number of shares of our common stock then outstanding, which will equal approximately _____ shares immediately after this offering, assuming an initial public offering price of \$ _____ per share, which is the midpoint of the price range set forth on the cover of this prospectus; and

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- the average weekly trading volume in our common stock on the New York Stock Exchange during the four calendar weeks preceding the date of filing of a Notice of Proposed Sale of Securities Pursuant to Rule 144 with respect to the sale.

Sales under Rule 144 by our affiliates are also subject to manner of sale provisions and notice requirements and to the availability of current public information about us.

Rule 701

In general, under Rule 701 as currently in effect, any of our employees, directors, officers, consultants or advisors who purchase shares from us in connection with a compensatory stock or option plan or other written agreement before the effective date of this offering is entitled to sell such shares 90 days after the effective date of this offering in reliance on Rule 144, in the case of affiliates, without having to comply with the holding period requirements of Rule 144 and, in the case of non-affiliates, without having to comply with the public information, holding period, volume limitation or notice filing requirements of Rule 144.

Lock-Up Agreements

Our officers, directors and other stockholders owning an aggregate of _____ shares of our common stock will be subject to lock-up agreements with the underwriters that will restrict the sale of the shares of our common stock held by them for 180 days, subject to certain exceptions. See “Underwriters” for a description of these lock-up agreements.

Registration Statements on Form S-8

Immediately after the completion of this offering, we intend to file a registration statement on Form S-8 under the Securities Act to register all of the shares of our common stock issued or reserved for future issuance under our equity incentive plans. This registration statement would cover approximately _____ shares. Shares registered under the registration statement will generally be available for sale in the open market after the 180-day lock-up period immediately following the date of this prospectus.

Registration Rights

Beginning 180 days after the date of this prospectus, subject to certain exceptions, holders of _____ shares of our common stock will be entitled to the registration rights described under “Certain Relationships and Related Party Transactions—Amended and Restated Stockholders Agreement.” Registration of these shares under the Securities Act would result in these shares becoming freely tradable without restriction under the Securities Act immediately upon effectiveness of the registration.

**MATERIAL UNITED STATES FEDERAL INCOME TAX CONSIDERATIONS
FOR NON-U.S. HOLDERS OF COMMON STOCK**

The following is a summary of certain material U.S. federal income tax considerations relating to the acquisition, ownership and disposition of shares of our common stock issued pursuant to this offering by “non-U.S. holders,” as defined below. This summary deals only with shares of our common stock acquired by a non-U.S. holder in this offering that are held as capital assets within the meaning of Section 1221 of the Code. This summary does not address the U.S. federal income tax considerations applicable to a non-U.S. holder that is subject to special treatment under U.S. federal income tax laws, including: a dealer in securities or currencies; a financial institution; a tax-exempt organization; a non-U.S. government; an insurance company; a person holding shares of our common stock as part of a hedging, integrated, conversion or straddle transaction or a person deemed to sell shares of our common stock under the constructive sale provisions of the Code; a trader in securities that has elected the mark-to-market method of accounting; an entity or arrangement that is treated as a partnership (or is disregarded from its owner) for U.S. federal income tax purposes; a person that received shares of our common stock in connection with services provided to the company or any of its affiliates; a person whose “functional currency” is not the U.S. dollar; a “controlled foreign corporation”; or a “passive foreign investment” company.

This summary is based upon provisions of the Code, and applicable Treasury regulations promulgated or proposed thereunder, rulings, judicial decisions and administrative pronouncements of the Internal Revenue Service (“IRS”), all as in effect as of the date hereof. Those authorities may be changed, perhaps with retroactive effect, or may be subject to differing interpretations, which could result in U.S. federal income tax consequences different from those discussed below. There can be no assurance that the IRS will concur with the discussion of the tax considerations set forth below, and we have not obtained, and we do not intend to obtain, a ruling from the IRS with respect to the U.S. federal income tax consequences to a non-U.S. holder of the purchase, ownership or disposition of shares of our common stock. This summary does not address all aspects of U.S. federal income tax and does not address any state, local, non-U.S., gift, or estate tax considerations or any considerations relating to the alternative minimum tax or the Medicare tax on net investment income.

For purposes of this discussion, a “non-U.S. holder” is a beneficial holder of shares of our common stock that is for U.S. federal income tax purposes not a partnership or disregarded entity and not (i) an individual citizen or resident of the United States for U.S. federal income tax purposes; (ii) a corporation (or any other entity treated as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia (or otherwise treated as a domestic corporation for U.S. federal income tax purposes); (iii) an estate the income of which is subject to U.S. federal income taxation regardless of its source; or (iv) a trust if it (1) is subject to the primary supervision of a court within the United States and one or more “United States persons” (as defined in Section 7701(a)(30) of the Code) have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable U.S. Treasury regulations to be treated as a U.S. person.

If an entity or arrangement that is treated as a partnership for U.S. federal income tax purposes holds shares of our common stock, the tax treatment of a person treated as a partner in such partnership for U.S. federal income tax purposes generally will depend upon the status of the partner, the activities of the partnership and certain determinations made at the partner level. Any entity or arrangement that is treated as a partnership for U.S. federal income tax purposes, and any person holding shares of our common stock through such a partnership, are urged to consult their own tax advisors regarding the tax consequences to them of acquiring, owning and disposing of shares of our common stock.

This summary is for general information only and is not, and is not intended to be, tax advice. Non-U.S. holders of shares of our common stock are urged to consult their own tax advisors concerning the tax considerations related to the acquisition, ownership and disposition of shares of our common stock in light of their particular circumstances, as well as any tax considerations relating to gift or estate taxes, the alternative

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minimum tax or to the Medicare tax on net investment income, and any tax considerations arising under the laws of any other jurisdiction, including any state, local and non-U.S. income and other tax laws and under any applicable income tax treaty.

Distributions

As discussed in the section entitled “Dividend Policy” above, we do not currently expect to make distributions in respect of our common stock. In the event that we do make a distribution of cash or property with respect to our common stock, any such distributions generally will constitute dividends for U.S. federal income tax purposes to the extent of our current and accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will first constitute a return of capital and will reduce a holder’s adjusted tax basis in such holder’s shares of our common stock, determined on a share-per-share basis, but not below zero. Any remaining excess will be treated as capital gain and subject to the tax treatment described below in the section entitled “—Sale, Exchange, Redemption or Certain Other Taxable Dispositions of Our Common Stock.”

Unless dividends, if any, are effectively connected with a non-U.S. holder’s U.S. trade or business (and if required by an applicable income tax treaty, are attributable to a permanent establishment or fixed base maintained in the United States), dividends paid to a non-U.S. holder of shares of our common stock generally will be subject to U.S. federal income tax (which generally will be collected through withholding) at a rate of 30% of the gross amount of the dividends (or such lower rate specified by an applicable income tax treaty). Even if a non-U.S. holder is eligible for a lower treaty rate, dividend payments generally will be subject to withholding at a 30% rate (rather than the lower treaty rate) unless the non-U.S. holder provides a valid IRS Form W-8BEN or W-8BEN-E (or applicable successor form) certifying such holder’s qualification for the reduced rate.

Subject to the discussions below regarding backup withholding and the Foreign Account Tax Compliance Act, if dividends paid to a non-U.S. holder are effectively connected with the non-U.S. holder’s conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, are attributable to a permanent establishment or fixed base maintained in the United States), the non-U.S. holder will be exempt from U.S. federal withholding tax. To claim the exemption, the non-U.S. holder must furnish to us or the relevant withholding agent a valid IRS Form W-8ECI (or applicable successor form), certifying that the dividends are effectively connected with the non-U.S. holder’s conduct of a trade or business within the United States.

Any dividends paid on shares of our common stock that are effectively connected with a non-U.S. holder’s U.S. trade or business (and, if required by an applicable tax treaty, attributable to a permanent establishment or fixed base maintained in the United States) generally will be subject to U.S. federal income tax on a net income basis in the same manner as if such holder were a U.S. person. A non-U.S. holder that is a corporation also may be subject to a branch profits tax at a rate of 30% (or such lower rate specified by an applicable tax treaty) on a portion of its effectively connected earnings and profits for the taxable year. Non-U.S. holders should consult their tax advisors regarding any applicable tax treaties that may provide for different rules.

Non-U.S. holders who do not timely provide us or the relevant withholding agent with the required certification, but who qualify for a reduced treaty rate, may obtain a refund of any excess amounts withheld by timely filing an appropriate claim for refund with the IRS. Non-U.S. holders should consult their tax advisors regarding their entitlement to benefits under a tax treaty.

If at the time a distribution is made we are not able to determine whether or not it will be treated as a dividend for U.S. federal income tax purposes (as opposed to being treated as a return of capital or capital gain), we or a financial intermediary may withhold tax on all or a portion of such distribution at the rate applicable to dividends. However, a non-U.S. holder may obtain a refund of any excess withholding by timely filing an appropriate claim for refund with the IRS.

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Any distribution described in this section would also be subject to the discussion below in the section entitled “Foreign Account Tax Compliance Act.”

Sale, Exchange, Redemption or Certain Other Taxable Dispositions of Our Common Stock

Subject to the discussions below regarding backup withholding and the Foreign Account Tax Compliance Act, anon-U.S. holder generally will not be subject to U.S. federal income tax or withholding tax on gain realized upon a sale, exchange or other taxable disposition of shares of our common stock (including a redemption, but only if the redemption would be treated as a sale or exchange rather than as a distribution for U.S. federal income tax purposes) unless: (i) the gain is effectively connected with the non-U.S. holder’s conduct of a trade or business in the United States (and, if required by an applicable income tax treaty, is attributable to a permanent establishment or fixed base maintained in the United States); (ii) the non-U.S. holder is a non-resident alien individual who is present in the United States for 183 days or more in the taxable year of that disposition, and certain other conditions are met; or (iii) we are or have been a “U.S. real property holding corporation” (“USRPHC”) for U.S. federal income tax purposes at any time within the shorter of the five-year period preceding the disposition and the non-U.S. holder’s holding period for shares of our common stock (the “relevant period”) and certain other conditions are met, as described below.

If the first exception applies, the non-U.S. holder generally will be subject to U.S. federal income tax on a net basis with respect to such gain in the same manner as if such holder were a resident of the United States. In addition, if the non-U.S. holder is a corporation for U.S. federal income tax purposes, such gains may, under certain circumstances, also be subject to the branch profits tax at a rate of 30% (or at a lower rate prescribed by an applicable income tax treaty), as adjusted for certain items.

If the second exception applies, the non-U.S. holder generally will be subject to U.S. federal income tax at a rate of 30% (or such lower rate specified by an applicable income tax treaty) on the gain from a disposition of shares of our common stock, which may be offset by capital losses allocable to U.S. sources during the taxable year of disposition (even though the non-U.S. holder is not considered a resident of the United States), provided the non-U.S. holder has timely filed U.S. federal income tax returns with respect to such losses.

With respect to the third exception above, we believe we currently are not, and we do not anticipate becoming, a USRPHC for U.S. federal income tax purposes. Because the determination of whether we are a USRPHC depends on the fair market value of our U.S. real property interests relative to the fair market value of our other trade or business assets and our non-U.S. real property interests, there can be no assurances that we will not become a USRPHC in the future. Generally, a corporation is a USRPHC only if the fair market value of its U.S. real property interests (as defined in the Code) equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Even if we are or become a USRPHC, a non-U.S. holder would not be subject to U.S. federal income tax on a sale, exchange or other taxable disposition of shares of our common stock by reason of our status as a USRPHC so long as (i) shares of our common stock continue to be regularly traded on an established securities market (within the meaning of Section 897(c)(3) of the Code) during the calendar year in which such disposition occurs and (ii) such non-U.S. holder does not own and is not deemed to own (directly, indirectly or constructively) more than 5% of the shares of our common stock at any time during the relevant period. If we are a USRPHC and the requirements described in clauses (i) or (ii) in the preceding sentence are not met, gain on the disposition of shares of our common stock generally will be taxed in the same manner as gain that is effectively connected with the conduct of a U.S. trade or business, except that the branch profits tax generally will not apply.

Information Reporting and Backup Withholding Tax

We or a financial intermediary must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on shares of our common stock paid to such holder and the tax withheld, if any, with respect to such distributions, regardless of whether withholding was required. This information also may be made

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available under a specific treaty or agreement with the tax authorities in the country in which the non-U.S. holder resides or is established. A non-U.S. holder generally will be subject to backup withholding at the then applicable rate for dividends paid to such holder unless such holder furnishes a valid IRS Form W-8BEN or W-8BEN-E (or such other applicable form and documentation as required by the Code or the Treasury regulations) certifying under penalties of perjury that it is a non-U.S. holder (and the payor does not have actual knowledge or reason to know that such holder is a U.S. person as defined under the Code), or otherwise establishes an exemption. Dividends paid to non-U.S. holders subject to U.S. federal withholding tax, as described above in the section entitled “Distributions,” generally will be exempt from U.S. backup withholding.

Information reporting and, depending on the circumstances, backup withholding will apply to the payment of the proceeds of a sale or other disposition of shares of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or non-U.S., unless such holder certifies that it is not a U.S. person (as defined under the Code) and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the U.S. through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Prospective investors should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be allowed as a credit against a non-U.S. holder's U.S. federal income tax liability, if any, and may entitle such holder to a refund, provided that an appropriate claim is timely filed with the IRS.

Foreign Account Tax Compliance Act

Under legislation commonly referred to as the Foreign Account Tax Compliance Act, as modified by Treasury regulations and subject to any official interpretations thereof, any applicable intergovernmental agreement between the United States and a non-U.S. government to implement these rules and improve international tax compliance, or any fiscal or regulatory legislation or rules adopted pursuant to any such agreement (collectively, “FATCA”), a 30% withholding tax will apply to dividends on, or gross proceeds from the sale or other disposition of, shares of our common stock paid to certain non-U.S. entities (including financial intermediaries) unless various information reporting and due diligence requirements, which are different from and in addition to the certification requirements described elsewhere in this discussion, have been satisfied (generally relating to ownership by U.S. persons of interests in or accounts with those entities). The withholding rules apply currently to payments of dividends on shares of our common stock. The withholding rules are scheduled to apply to payments of gross proceeds from dispositions of shares of our common stock beginning January 1, 2019.

Holders of shares of our common stock should consult their tax advisors regarding the possible impact of FATCA on their investment in our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the potential imposition of the 30% withholding tax under FATCA.

UNDERWRITERS

Under the terms and subject to the conditions in an underwriting agreement dated the date of this prospectus, the underwriters named below, for whom Morgan Stanley & Co. LLC and Goldman Sachs & Co. LLC are acting as representatives, have severally agreed to purchase, and we have agreed to sell to them, severally, the number of shares indicated below:

<u>Name</u>	<u>Number of Shares</u>
Morgan Stanley & Co. LLC	
Goldman Sachs & Co. LLC	
Citigroup Global Markets Inc.	
Credit Suisse Securities (USA) LLC	
J.P. Morgan Securities LLC	
Jefferies LLC	
Deutsche Bank Securities Inc.	
KeyBanc Capital Markets Inc.	
Evercore Group L.L.C.	
Nomura Securities International, Inc.	
Total:	=====

The underwriters and the representatives are collectively referred to as the “underwriters” and the “representatives,” respectively. The underwriters are offering the shares of our common stock subject to their receipt and acceptance of the shares from us and subject to prior sale. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part. The underwriting agreement provides that the obligations of the several underwriters to pay for and accept delivery of the shares of our common stock offered by this prospectus are subject to the approval of certain legal matters by their counsel and to certain other conditions. The underwriters are obligated to take and pay for all of the shares of our common stock offered by this prospectus if any such shares are taken. However, the underwriters are not required to take or pay for the shares covered by the underwriters’ option to purchase additional shares described below. The underwriters may offer and sell the shares through certain of their respective affiliates or selling agents.

The underwriters initially propose to offer part of the shares of our common stock directly to the public at the offering price listed on the cover page of this prospectus and part to certain dealers at a price that represents a concession not in excess of \$ per share under the public offering price. After the initial offering of the shares of our common stock, the offering price and other selling terms may from time to time be varied by the representatives.

We have granted to the underwriters an option, exercisable for 30 days from the date of this prospectus, to purchase up to additional shares of our common stock at the public offering price listed on the cover page of this prospectus, less underwriting discounts and commissions. To the extent the option is exercised, each underwriter will become obligated, subject to certain conditions, to purchase about the same percentage of the additional shares of our common stock as the number listed next to the underwriter’s name in the preceding table bears to the total number of shares of our common stock listed next to the names of all underwriters in the preceding table.

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The following table shows the per share and total public offering price, underwriting discounts and commissions and proceeds before expenses to us. These amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase up to an additional _____ shares of our common stock.

	Per Share	Total	
		No Exercise	Full Exercise
Public offering price	\$	\$	\$
Underwriting discounts and commissions	\$	\$	\$
Proceeds, before expenses, to us	\$	\$	\$

The estimated offering expenses payable by us, exclusive of the underwriting discounts and commissions, are approximately \$ _____. We have agreed to reimburse the underwriters for expenses relating to clearance of this offering with the Financial Industry Regulatory Authority up to \$25,000.

The underwriters have informed us that they do not intend for sales to discretionary accounts to exceed 5% of the total number of shares of our common stock offered by them.

We have applied to list our common stock on the New York Stock Exchange under the trading symbol "PQG."

We and our officers, directors and certain holders of our common stock have agreed with the underwriters, subject to certain exceptions, not to dispose of or hedge any of our or their shares of our common stock or securities convertible into or exchangeable for shares of our common stock during the period from the date of this prospectus continuing through the date 180 days after the date of this prospectus, except with the prior written consent of Morgan Stanley & Co. LLC and Goldman Sachs & Co. LLC. This agreement does not apply to any existing employee benefit plans. See "Shares Eligible for Future Sale" for a discussion of certain transfer restrictions.

In order to facilitate the offering of our common stock, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of our common stock. Specifically, the underwriters may sell more shares than they are obligated to purchase under the underwriting agreement, creating a short position. A short sale is covered if the short position is no greater than the number of shares available for purchase by the underwriters under the option to purchase additional shares. The underwriters can close out a covered short sale by exercising the option to purchase additional shares or purchasing shares in the open market. In determining the source of shares to close out a covered short sale, the underwriters will consider, among other things, the open market price of shares compared to the price available under the option to purchase additional shares. The underwriters may also sell shares in excess of the option, creating a naked short position. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of our common stock in the open market after pricing that could adversely affect investors who purchase in this offering. As an additional means of facilitating this offering, the underwriters may bid for, and purchase, shares of our common stock in the open market to stabilize the price of our common stock. These activities may raise or maintain the market price of our common stock above independent market levels or prevent or retard a decline in the market price of our common stock. The underwriters are not required to engage in these activities and may end any of these activities at any time.

We and the underwriters have agreed to indemnify each other against certain liabilities, including liabilities under the Securities Act.

Sales of shares made outside the United States may be made by affiliates of the underwriters.

A prospectus in electronic format may be made available on websites maintained by one or more underwriters, or selling group members, if any, participating in this offering. The representatives may agree to

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allocate a number of shares of our common stock to underwriters for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters that may make Internet distributions on the same basis as other allocations.

The underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. Certain of the underwriters and their respective affiliates have, from time to time, performed, and may in the future perform, various financial advisory and investment banking services for us, for which they received or will receive customary fees and expenses. In particular, Morgan Stanley & Co. LLC, Goldman Sachs & Co. LLC, Citigroup Global Markets Inc., Credit Suisse Securities (USA) LLC, J.P. Morgan Securities LLC, Jefferies LLC, Deutsche Bank Securities Inc. and KeyBanc Capital Markets Inc. or certain of their affiliates are lenders or act as agents or arrangers under our Senior Secured Credit Facilities.

In addition, in the ordinary course of their various business activities, the underwriters and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve our securities and instruments. The underwriters and their respective affiliates may also make investment recommendations or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long or short positions in such securities and instruments.

Pricing of the Offering

Prior to this offering, there has been no public market for our common stock. The initial public offering price was determined by negotiations between us and the representatives. Among the factors considered in determining the initial public offering price were our future prospects and those of our industry in general, our sales, earnings and certain other financial and operating information in recent periods, and the price-earnings ratios, price-sales ratios, market prices of securities, and certain financial and operating information of companies engaged in activities similar to ours.

Selling Restrictions

European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a “Relevant Member State”) an offer to the public of any shares of our common stock may not be made in that Relevant Member State, except that an offer to the public in that Relevant Member State of any shares of our common stock may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

- (a) to any legal entity which is a qualified investor as defined in the Prospectus Directive;
- (b) to fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the representatives for any such offer; or
- (c) in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares of our common stock shall result in a requirement for the publication by us or any underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive.

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For the purposes of this provision, the expression an “offer to the public” in relation to any shares of our common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any shares of our common stock to be offered so as to enable an investor to decide to purchase any shares of our common stock, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression “Prospectus Directive” means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State.

United Kingdom

Each underwriter has represented and agreed that:

- (a) it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act 2000 (“FSMA”)) received by it in connection with the issue or sale of the shares of our common stock in circumstances in which Section 21(1) of the FSMA does not apply to us; and
- (b) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares of our common stock in, from or otherwise involving the United Kingdom.

Australia

No placement document, prospectus, product disclosure statement or other disclosure document has been lodged with the Australian Securities and Investments Commission (ASIC), in relation to the offering. This prospectus does not constitute a prospectus, product disclosure statement or other disclosure document under the Corporations Act 2001 (the “Corporations Act”), and does not purport to include the information required for a prospectus, product disclosure statement or other disclosure document under the Corporations Act.

Any offer in Australia of the shares may only be made to persons (the “Exempt Investors”) who are “sophisticated investors” (within the meaning of section 708(8) of the Corporations Act), “professional investors” (within the meaning of section 708(11) of the Corporations Act) or otherwise pursuant to one or more exemptions contained in section 708 of the Corporations Act so that it is lawful to offer the shares without disclosure to investors under Chapter 6D of the Corporations Act. The shares applied for by Exempt Investors in Australia must not be offered for sale in Australia in the period of 12 months after the date of allotment under the offering, except in circumstances where disclosure to investors under Chapter 6D of the Corporations Act would not be required pursuant to an exemption under section 708 of the Corporations Act or otherwise or where the offer is pursuant to a disclosure document which complies with Chapter 6D of the Corporations Act. Any person acquiring shares must observe such Australian on-sale restrictions.

This prospectus contains general information only and does not take account of the investment objectives, financial situation or particular needs of any particular person. It does not contain any securities recommendations or financial product advice. Before making an investment decision, investors need to consider whether the information in this prospectus is appropriate to their needs, objectives and circumstances, and, if necessary, seek expert advice on those matters.

Canada

The shares of our common stock may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the shares of our common stock must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

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Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

Dubai International Financial Centre

This prospectus relates to an Exempt Offer in accordance with the Offered Securities Rules of the Dubai Financial Services Authority (DFSA). This prospectus is intended for distribution only to persons of a type specified in the Offered Securities Rules of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this prospectus nor taken steps to verify the information set forth herein and has no responsibility for the prospectus. The shares to which this prospectus relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the shares offered should conduct their own due diligence on the shares. If you do not understand the contents of this prospectus you should consult an authorized financial advisor.

Hong Kong

The shares have not been offered or sold and will not be offered or sold in Hong Kong, by means of any document, other than (a) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong and any rules made under that Ordinance; or (b) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies Ordinance (Cap. 32) of Hong Kong or which do not constitute an offer to the public within the meaning of that Ordinance. No advertisement, invitation or document relating to the shares has been or may be issued or has been or may be in the possession of any person for the purposes of issue, whether in Hong Kong or elsewhere, which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to the shares which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the Securities and Futures Ordinance and any rules made under that Ordinance.

Japan

No registration pursuant to Article 4, paragraph 1 of the Financial Instruments and Exchange Law of Japan (Law No. 25 of 1948, as amended) (the "FIEL") has been made or will be made with respect to the solicitation of the application for the acquisition of the shares of our common stock.

Accordingly, the shares of our common stock have not been, directly or indirectly, offered or sold and will not be, directly or indirectly, offered or sold in Japan or to, or for the benefit of, any resident of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan) or to others for re-offering or re-sale, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan except pursuant to an exemption from the registration requirements, and otherwise in compliance with, the FIEL and the other applicable laws and regulations of Japan.

For Qualified Institutional Investors ("QII")

Please note that the solicitation for newly-issued or secondary securities (each as described in Paragraph 2, Article 4 of the FIEL) in relation to the shares of our common stock constitutes either a "QII only private

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placement” or a “QII only secondary distribution” (each as described in Paragraph 1, Article 23-13 of the FIEL). Disclosure regarding any such solicitation, as is otherwise prescribed in Paragraph 1, Article 4 of the FIEL, has not been made in relation to the shares of our common stock. The shares of our common stock may only be transferred to QIIs.

For Non-QII Investors

Please note that the solicitation for newly-issued or secondary securities (each as described in Paragraph 2, Article 4 of the FIEL) in relation to the shares of our common stock constitutes either a “small number private placement” or a “small number private secondary distribution” (each as is described in Paragraph 4, Article 23-13 of the FIEL). Disclosure regarding any such solicitation, as is otherwise prescribed in Paragraph 1, Article 4 of the FIEL, has not been made in relation to the shares of our common stock. The shares of our common stock may only be transferred en bloc without subdivision to a single investor.

Singapore

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of our shares may not be circulated or distributed, nor may our shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (1) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore, or the SFA, (2) to a relevant person or any person pursuant to Section 275(1A), and in accordance with the conditions specified in Section 275 of the SFA, or (3) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA, in each case subject to compliance with conditions set forth in the SFA.

Where our shares are subscribed or purchased under Section 275 by a relevant person which is: (a) a corporation (which is not an accredited investor as defined in Section 4A of the SFA) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or (b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor; shares, debentures and units of shares and debentures of that corporation or the beneficiaries’ rights and interest (howsoever described) in that trust shall not transferred within six months after that corporation or that trust has acquired the shares under Section 275 of the SFA, except: (1) to an institutional investor (for corporations under Section 274 of the SFA) or to a relevant person defined in Section 275(2) of the SFA, or to any person pursuant to an offer that is made on terms that such shares, debentures and units of shares and debentures of that corporation or such rights and interest in that trust are acquired at a consideration of not less than \$200,000 (or its equivalent in a foreign currency) for each transaction, whether such amount is to be paid for in cash or by exchange of securities or other assets, and further for corporations, in accordance with the conditions, specified in Section 275 of the SFA; (2) where no consideration is or will be given for the transfer; or (3) where the transfer is by operation of law.

Switzerland

The shares may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange (SIX) or on any other stock exchange or regulated trading facility in Switzerland. This document has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the shares or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, the company, the shares have been or will be filed with or approved by any Swiss regulatory authority. In particular, this document

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will not be filed with, and the offer of shares will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA (FINMA), and the offer of shares has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes (CISA). The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of shares.

LEGAL MATTERS

The validity of the issuance of the shares of common stock to be sold in this offering will be passed upon for us by Ropes & Gray LLP, Boston, Massachusetts. Certain legal matters in connection with this offering will be passed upon on behalf of the underwriters by Latham & Watkins LLP, Washington, District of Columbia.

EXPERTS

The financial statements of PQ Group Holdings Inc. as of December 31, 2016 and 2015 and for the years then ended included in this prospectus have been so included in reliance on the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

The consolidated financial statements of Eco Services Operations LLC (accounting predecessor to PQ Group Holdings Inc.) for the period from inception (July 30, 2014) to December 31, 2014 (Successor Period), and of Eco, a business unit of Solvay USA Inc., for the period from January 1, 2014 through November 30, 2014 (Predecessor Period) included in this prospectus, have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report appearing herein (which report expresses an unqualified opinion and includes an emphasis of matter paragraph referring to the “carve out” of the Predecessor financial statements from Solvay USA Inc.). Such financial statements have been so included in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

The financial statements of PQ Holdings Inc. as of December 31, 2015 and 2014 and for each of the three years in the period ended December 31, 2015 included in this prospectus have been so included in reliance on the report of PricewaterhouseCoopers LLP, independent accountants, given on the authority of said firm as experts in auditing and accounting.

The financial statements of Zeolyst International as of December 31, 2016 and 2015 and for each of the three years in the period ended December 31, 2016 included in this prospectus have been so included in reliance on the report of PricewaterhouseCoopers LLP, independent accountants, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the shares of our common stock being offered by this prospectus. This prospectus, which forms a part of the registration statement, does not contain all of the information set forth in the registration statement. For further information with respect to us and the shares of our common stock, reference is made to the registration statement and the exhibits and schedules filed as a part thereof. Statements contained in this prospectus as to the contents of any contract or other document are not necessarily complete. We are not currently subject to the informational requirements of the Exchange Act. As a result of this offering, we will become subject to the informational requirements of the Exchange Act and, in accordance therewith, will file reports and other information with the SEC. The registration statement, such reports and other information can be inspected and copied at the Public Reference Room of the SEC located at 100 F Street, N.E., Washington, D.C. 20549. Copies of such materials, including copies of all or any portion of the registration statement, can be obtained from the Public Reference Room of the SEC at prescribed rates. You can call the SEC at 1-800-SEC-0330 to obtain information on the operation of the Public Reference Room. Such materials may also be accessed electronically by means of the SEC’s website at www.sec.gov.

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Audited Financial Statements

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Report of Independent Registered Public Accounting Firm

To the board of directors and stockholders of
PQ Group Holdings Inc.

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows present fairly, in all material respects, the financial position of PQ Group Holdings Inc. and its subsidiaries as of December 31, 2016 and 2015, and the results of their operations and their cash flows for the years then ended in conformity with accounting principles generally accepted in the United States of America. In addition, in our opinion, the financial statement schedule, listed in the accompanying index presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements. These financial statements and financial statement schedule are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements and financial statement schedule based on our audits. We conducted our audits of these financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP
Philadelphia, Pennsylvania
June 9, 2017

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders of
PQ Group Holdings, Inc.

We have audited the accompanying consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows of Eco Services Operations LLC and subsidiary (accounting predecessor to PQ Group Holdings, Inc.) for the period from inception (July 30, 2014) to December 31, 2014 (the "Successor Period") and the accompanying statements of operations, comprehensive income (loss), stockholders' equity, and cash flows of Eco, a business unit of Solvay USA Inc., for the period from January 1, 2014 to November 30, 2014 (the "Predecessor Period") (collectively the "financial statements"). These financial statements are the responsibility of the entities' management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The entities were not required to have, nor were we engaged to perform, an audit of their internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entities' internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the results of operations and cash flows of Eco Services Operations LLC and subsidiary for the period from inception (July 30, 2014) to December 31, 2014, in accordance with accounting principles generally accepted in the United States of America. Further, in our opinion, the financial statements referred to above present fairly, in all material respects, the results of operations and cash flows of Eco, a business unit of Solvay USA Inc., for the period from January 1, 2014 to November 30, 2014, in accordance with accounting principles generally accepted in the United States of America.

As discussed in Note 1 to the financial statements, the accompanying financial statements of Eco, a business unit of Solvay USA Inc., have been "carved out" from Solvay USA Inc.'s financial statements using assumptions and allocations made by Solvay USA Inc. to depict Eco on a stand-alone basis and may not necessarily be indicative of Eco's results of operations or cash flows had Eco operated as a stand-alone entity. Our opinion is not modified with respect to this matter.

/s/ DELOITTE & TOUCHE LLP

Parsippany, New Jersey
May 15, 2015, except for Note 12 and Note 20, as to which the date is June 8, 2017

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

	December 31, 2016	December 31, 2015
ASSETS		
Cash and cash equivalents	\$ 70,742	\$ 25,155
Receivables, net	160,581	34,333
Inventories (Note 9)	227,048	10,179
Prepaid and other current assets	34,307	1,858
Total current assets	492,678	71,525
Investments in affiliated companies (Note 10)	459,406	—
Property, plant and equipment, net (Note 11)	1,181,388	481,073
Goodwill (Note 13)	1,241,429	311,892
Other intangible assets, net (Note 13)	816,573	137,284
Other long-term assets	68,197	5,862
Total assets	<u>\$ 4,259,671</u>	<u>\$ 1,007,636</u>
LIABILITIES		
Notes payable and current maturities of long-term debt (Note 15)	\$ 14,481	\$ 5,000
Accounts payable	128,478	15,878
Accrued liabilities (Note 14)	99,433	35,387
Total current liabilities	242,392	56,265
Long-term debt (Note 15)	2,547,717	668,101
Deferred income taxes (Note 18)	318,463	—
Other long-term liabilities (Note 16)	123,155	47,977
Total liabilities	<u>3,231,727</u>	<u>772,343</u>
Commitments and contingencies (Note 22)		
EQUITY		
Common stock, Class B (\$0.01 par); authorized shares 30,000,000; issued shares 6,727,685; outstanding shares 6,726,907 on December 31, 2016	67	—
Common stock, Class A (\$0.01 par); authorized shares 160,500,000; issued shares 627,251; outstanding shares 626,135 on December 31, 2016	6	—
Additional paid-in capital	1,167,137	245,279
Accumulated deficit	(90,380)	(10,634)
Treasury stock, at cost; shares 778 (Class B) and 1,116 (Class A) on December 31, 2016	(239)	—
Accumulated other comprehensive income (loss)	(53,711)	648
Total PQ Group Holdings Inc. equity	1,022,880	235,293
Noncontrolling interest	5,064	—
Total equity	<u>1,027,944</u>	<u>235,293</u>
Total liabilities and equity	<u>\$ 4,259,671</u>	<u>\$ 1,007,636</u>

See accompanying notes to consolidated financial statements.

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

	<u>Years ended</u> <u>December 31,</u>		<u>Successor</u> <u>Period from</u> <u>inception (July 30,</u> <u>2014) to</u> <u>December 31,</u>	<u>Predecessor</u> <u>Period from</u> <u>January 1,</u> <u>2014 to</u> <u>November 30,</u>
	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2014</u>
Sales	\$1,064,177	\$ 388,875	\$ 35,539	\$ 361,823
Cost of goods sold	<u>810,085</u>	<u>278,791</u>	<u>30,160</u>	<u>265,829</u>
Gross profit	254,092	110,084	5,379	95,994
Selling, general and administrative expenses	107,601	34,613	2,623	45,168
Other operating expense, net (Note 8)	<u>62,301</u>	<u>19,696</u>	<u>16,347</u>	<u>5,593</u>
Operating income (loss)	84,190	55,775	(13,591)	45,233
Equity in net income (loss) from affiliated companies (Note 10)	(2,612)	—	—	—
Interest expense	140,315	44,348	8,470	86
Debt extinguishment costs (Note 15)	13,782	—	—	—
Other (income) expense, net	<u>(3,402)</u>	<u>—</u>	<u>—</u>	<u>—</u>
Income (loss) before income taxes and noncontrolling interest	(69,117)	11,427	(22,061)	45,147
Provision for income taxes	<u>10,041</u>	<u>—</u>	<u>—</u>	<u>14,602</u>
Net income (loss)	(79,158)	11,427	(22,061)	30,545
Less: Net income attributable to the noncontrolling interest	588	—	—	—
Net income (loss) attributable to PQ Group Holdings Inc.	<u>\$ (79,746)</u>	<u>\$ 11,427</u>	<u>\$ (22,061)</u>	<u>\$ 30,545</u>
Basic net income (loss) per share:				
Class B shares	\$ —	\$ 7.58	\$ (14.78)	
Class A shares	\$ (185.43)	\$ —	\$ —	
Diluted net income (loss) per share:				
Class B shares	\$ —	\$ 7.58	\$ (14.78)	
Class A shares	\$ (185.43)	\$ —	\$ —	
Weighted average shares outstanding—Basic:				
Class B shares	4,947,982	1,507,719	1,492,682	
Class A shares	<u>430,051</u>	<u>—</u>	<u>—</u>	
Total weighted average shares outstanding—Basic	<u>5,378,033</u>	<u>1,507,719</u>	<u>1,492,682</u>	
Weighted average shares outstanding—Diluted:				
Class B shares	4,947,982	1,507,719	1,492,682	
Class A shares	<u>430,051</u>	<u>—</u>	<u>—</u>	
Total weighted average shares outstanding— Diluted	<u>5,378,033</u>	<u>1,507,719</u>	<u>1,492,682</u>	

See accompanying notes to consolidated financial statements.

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

	<u>Years ended</u> <u>December 31,</u>		<u>Successor</u> <u>Period from</u> <u>inception</u> <u>(July 30, 2014)</u> <u>to December 31,</u> <u>2014</u>	<u>Predecessor</u> <u>Period from</u> <u>January 1, 2014</u> <u>to November 30,</u> <u>2014</u>
	<u>2016</u>	<u>2015</u>		
Net income (loss)	\$ (79,158)	\$ 11,427	\$ (22,061)	\$ 30,545
Other comprehensive income (loss), net of tax:				
Pension and postretirement benefits	6,865	648	—	—
Net gain from hedging activities	4,557	—	—	—
Foreign currency translation	(66,834)	—	—	—
Total other comprehensive income (loss)	(55,412)	648	—	—
Comprehensive income (loss)	(134,570)	12,075	(22,061)	30,545
Less: Comprehensive income attributable to noncontrolling interests	(465)	—	—	—
Comprehensive income (loss) attributable to PQ Group Holdings Inc.	<u>\$ (134,105)</u>	<u>\$ 12,075</u>	<u>\$ (22,061)</u>	<u>\$ 30,545</u>

See accompanying notes to consolidated financial statements.

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

	Parent company investment	Common stock, Class B	Common stock, Class A	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Noncontrolling interest	Total
Predecessor									
Balance, January 1, 2014	\$ 540,215	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 540,215
Net income	30,545								30,545
Net transfers to Parent	(24,206)								(24,206)
Balance, November 30, 2014	<u>\$ 546,554</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 546,554</u>
Successor									
Balance, July 30, 2014	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Equity contribution	—	—	—	239,885	—	—	—	—	239,885
Net loss	—	—	—	—	(22,061)	—	—	—	(22,061)
Balance, December 31, 2014	\$ —	\$ —	\$ —	\$ 239,885	\$ (22,061)	\$ —	\$ —	\$ —	\$ 217,824
Net income	—	—	—	—	11,427	—	—	—	11,427
Other comprehensive income	—	—	—	—	—	—	648	—	648
Equity contribution	—	—	—	3,138	—	—	—	—	3,138
Stock compensation for restricted stock awards	—	—	—	2,256	—	—	—	—	2,256
Balance, December 31, 2015	\$ —	\$ —	\$ —	\$ 245,279	\$ (10,634)	\$ —	\$ 648	\$ —	\$ 235,293
Business Combination	—	67	6	912,127	—	—	—	6,569	918,769
Net income (loss)	—	—	—	—	(79,746)	—	—	588	(79,158)
Other comprehensive loss	—	—	—	—	—	—	(54,359)	(1,053)	(55,412)
Stock repurchase	—	—	—	—	—	(2,540)	—	—	(2,540)
Equity contribution	—	—	—	6,486	—	114	—	—	6,600
Dividend distribution	—	—	—	—	—	—	—	(1,040)	(1,040)
Stock compensation	—	—	—	3,245	—	2,187	—	—	5,432
Balance, December 31, 2016	<u>\$ —</u>	<u>\$ 67</u>	<u>\$ 6</u>	<u>\$ 1,167,137</u>	<u>\$ (90,380)</u>	<u>\$ (239)</u>	<u>\$ (53,711)</u>	<u>\$ 5,064</u>	<u>\$ 1,027,944</u>

See accompanying notes to consolidated financial statements.

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

	Years ended		Successor	Predecessor
	December 31,	December 31,	Period from inception (July 30, 2014) to December 31, 2014	Period from January 1, 2014 to November 30, 2014
	2016	2015		
Cash flows from operating activities:				
Net income (loss)	\$ (79,158)	\$ 11,427	\$ (22,061)	\$ 30,545
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:				
Depreciation	89,453	28,790	2,103	33,171
Amortization	38,836	10,210	852	9,287
Acquisition accounting valuation adjustments on inventory sold	29,086	—	—	—
Intangible asset impairment charge	6,873	—	—	—
Amortization of deferred financing costs and original issue discount	6,859	3,115	255	—
Debt extinguishment costs	8,561	—	—	—
Debt modification creditor fees capitalized	(2,988)	—	—	—
Foreign currency exchange gain	(3,558)	—	—	—
Pension and postretirement healthcare benefit expense	1,957	2,900	—	—
Pension and postretirement healthcare benefit funding	(2,887)	(14,937)	—	—
Deferred income tax expense (benefit)	835	—	—	(10,264)
Net loss on asset disposals	4,216	3,911	—	—
Supplemental pension plan mark-to-market gain	(300)	—	—	—
Stock compensation	5,432	2,256	—	535
Equity in net loss from affiliated companies	2,612	—	—	—
Dividends received from affiliated companies	7,636	—	—	—
Working capital changes that provided (used) cash, excluding the effect of business combinations:				
Receivables	27,757	(280)	(7,881)	(4,105)
Inventories	(2,305)	(1,738)	4,855	(5,216)
Prepays and other current assets	548	20,096	(2,199)	(33)
Accounts payable	11,885	(2,486)	(1,568)	6,832
Accrued liabilities	(24,839)	(13,809)	23,324	2,617
Other, net	(6,791)	(4,740)	263	(5,776)
Net cash provided by (used in) operating activities	<u>119,720</u>	<u>44,715</u>	<u>(2,057)</u>	<u>57,593</u>
Cash flows from investing activities:				
Purchases of property, plant and equipment	(121,421)	(40,994)	(2,892)	(32,690)
Change in restricted cash, net	(14,786)	—	—	—
Loan receivable under the New Market Tax Credit arrangement	(15,598)	—	—	—
Business combinations, net of cash acquired	(1,777,740)	3,965	(885,440)	—
Other, net	(135)	(1,696)	(15)	(162)
Net cash used in investing activities	<u>(1,929,680)</u>	<u>(38,725)</u>	<u>(888,347)</u>	<u>(32,852)</u>
Cash flows from financing activities:				
Draw down of revolver	145,000	12,000	—	—
Repayments of revolver	(167,000)	(12,000)	—	—
Issuance of long-term debt under the New Market Tax Credit arrangement	22,000	—	—	—
Issuance of long-term debt, net of original issue discount and financing fees	1,219,791	—	497,500	—
Issuance of long-term notes, net of original issue discount and financing fees	1,124,629	—	200,000	—
Debt issuance costs	(5,397)	—	(24,354)	—
Repayments of long-term debt	(479,059)	(5,000)	—	—
Interest rate hedge premium	(1,551)	—	—	—
Equity contribution	6,600	1,538	239,885	—
Stock repurchase	(2,540)	—	—	—
Distributions to noncontrolling interests	(1,040)	—	—	—
Net transfers to parent	—	—	—	(24,741)
Net cash provided by (used in) financing activities	<u>1,861,433</u>	<u>(3,462)</u>	<u>913,031</u>	<u>(24,741)</u>
Effect of exchange rate changes on cash and cash equivalents	(5,886)	—	—	—
Net change in cash and cash equivalents	45,587	2,528	22,627	—
Cash and cash equivalents at beginning of period	25,155	22,627	—	—
Cash and cash equivalents at end of period	<u>\$ 70,742</u>	<u>\$ 25,155</u>	<u>\$ 22,627</u>	<u>\$ —</u>
Supplemental cash flow information:				
Cash paid for taxes	\$ 16,981	\$ —	\$ —	\$ —
Cash paid for interest	\$ 132,579	\$ 44,074	\$ 1	\$ 59
Non-cash investing activity:				
Capital expenditures acquired on account but unpaid as of the period end	\$ 18,161	\$ 624	\$ —	\$ —
Non-cash financing activity				
Equity consideration for the Business Combination	\$ 910,800	\$ —	\$ —	\$ —
Debt assumed in the Business Combination	\$ 22,911	\$ —	\$ —	\$ —
Non-cash equity contribution	\$ —	\$ 1,600	\$ —	\$ —

See accompanying notes to consolidated financial statements.

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

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 businesses: 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 Environmental Catalysts & Services: an industry-leading refinery services company that is also 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 and as an integrated silica catalyst and specialty zeolite-based catalyst producer, producing silica catalyst used in the production of high-density polyethylene (“HDPE”) and methyl methacrylate (“MMA”), and specialty zeolite-based catalysts sold to the emissions control industry, the petrochemical industry and other areas of the broader chemicals industry.

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

Eco Services Acquisition from Solvay

On July 30, 2014, Eco Services Operations LLC (“Eco Services”), a newly formed Delaware limited liability company and certain investment funds affiliated with CCMP Capital Advisors, LLC (now known as CCMP Capital Advisors, LP; “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 (“Eco”) 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 operated as a business unit within Solvay, which is an indirect, wholly owned subsidiary of Solvay SA, an international industrial group active in chemistry and headquartered in Brussels, Belgium.

On December 1, 2014, Eco Services consummated the 2014 Acquisition (see Note 6 to these consolidated financial statements for further information). The consolidated financial statements for the period from inception (July 30, 2014) to December 31, 2014 reflect the financial results of Eco Services on a stand-alone basis (the “Successor Period”), with nominal activity between July 30 and November 30, 2014. Transaction costs attributed to the 2014 Acquisition as well as certain costs related to bridge financing and other interest expense were allocated to the Successor Period.

The financial statements prior to the 2014 Acquisition reflect the financial results based upon the historical cost basis of Solvay’s Eco business unit, and include amounts that have been “carved out” from Solvay’s financial statements using assumptions and allocations made by Solvay to depict Solvay’s Eco business unit on a stand-alone basis (the “Predecessor Period”). As a result, the Predecessor Period from January 1, 2014 to November 30, 2014 included herein may not necessarily be indicative of Solvay’s Eco business unit’s results of operations or cash flows had Solvay’s Eco business unit operated solely as a stand-alone entity during the period presented.

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

The financial statements related to the Predecessor Period were prepared using the historical basis of the assets and liabilities of Solvay's Eco business unit and include all sales, costs, assets and liabilities directly attributable to Solvay's Eco business unit. In addition, certain expenses reflected in the Predecessor Period are based on allocations of corporate expenses from Solvay using methodologies that in the opinion of management are reasonable and consistently applied. All such expenses are deemed to have been paid by Solvay's Eco business unit to Solvay in the period in which the expenses were incurred. Net changes in the parent company investment in Solvay's Eco business unit as shown in the statement of stockholders' equity and cash flows for the Predecessor Period include amounts due to or from Solvay that are not regularly settled and therefore, represent investment of such amounts by Solvay.

Solvay used a centralized approach to cash management and financing the operations of Solvay's Eco business unit as needed. Transactions between Solvay and Solvay's Eco business unit were accounted for through the parent company investment. Accordingly, none of the cash, cash equivalents, debt or related interest expense at the Solvay level in the Predecessor Period have been assigned to Solvay's Eco business unit with the exception of capital lease obligations and related interest expense that related to Solvay's Eco business unit.

PQ Merger with Eco Services

On August 17, 2015, the Company, PQ Holdings Inc. ("PQ Holdings"), Eco Services, certain investment funds affiliated with CCMP, and certain other 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 (see Note 7 to these consolidated financial statements for further information).

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 consolidated financial statements are the continuation of Eco Services' business prior to the Business Combination.

Concurrent with the closing of the Business Combination, the Company refinanced the existing credit facilities of PQ Holdings and Eco Services by (i) entering into a \$1,200,000 senior secured term loan (consisting of a \$900,000 senior secured term loan and a \$300,000 Euro equivalent senior secured term loan), (ii) \$625,000 in new senior secured notes, (iii) issuing \$525,000 in senior unsecured notes, and (iv) entering into a \$200,000 asset-based secured revolving credit facility (see Note 15 to these consolidated financial statements for further information). Additionally, PQ Group Holdings assumed the obligations under the indenture governing Eco Services' outstanding \$200,000 senior notes.

2. Summary of Significant Accounting Policies:

Principles of Consolidation. The consolidated financial statements include the accounts of the Company and its controlled subsidiaries. Investments in affiliated companies are recorded at cost plus the Company's equity in their undistributed earnings. All intercompany transactions have been eliminated. Noncontrolling interests represent third-party equity ownership in certain of the Company's consolidated subsidiaries and are presented as a component of equity separate from the equity attributable to the Company's shareholders. The noncontrolling interests' share in the Company's net earnings are included in net income attributable to the noncontrolling

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

interest in the Company's consolidated statements of operations, and their portion of the Company's comprehensive income is included in comprehensive income attributable to noncontrolling interests in the Company's consolidated statements of comprehensive income (loss). The Company's noncontrolling interests relate to third-party minority ownership interests held in certain of the Company's foreign subsidiaries acquired as part of the Business Combination.

All assets and liabilities of foreign subsidiaries and affiliated companies are translated to U.S. dollars using exchange rates in effect at the balance sheet date. Adjustments resulting from translation of the balance sheets and intercompany loans, which are considered permanent, are included in stockholders' equity as part of accumulated other comprehensive loss. Adjustments resulting from translation of certain intercompany loans, which are not considered permanent and are denominated in foreign currencies, are included in other (income) expense, net in the consolidated statement of operations. The Company considers intercompany loans to be of a permanent or long-term nature if management expects and intends that the loans will not be repaid. For the year ended December 31, 2016, all intercompany loan arrangements were determined to be non-permanent based on management's intention as well as actual lending and repayment activity. Therefore, the foreign currency transaction gains or losses associated with the intercompany loans were recorded in the statement of operations for the year ended December 31, 2016.

Income and expense items are translated at average exchange rates during the year. Net foreign exchange included in other (income) expense, net was a gain of \$3,558 for the year ended December 31, 2016. The Company did not incur any foreign exchange expense for the years ended December 31, 2015 or 2014 (including Predecessor and Successor periods). The foreign currency gains realized in 2016 were primarily driven by the non-permanent intercompany debt denominated in local currency and translated to U.S. dollars.

Cash and Cash Equivalents. Cash and cash equivalents include investments with original terms to maturity of 90 days or less from the time of purchase.

Restricted Cash. Restricted cash, which is restricted as to withdrawal or usage, is classified separately from cash and cash equivalents on our consolidated balance sheet. The proceeds from the New Markets Tax Credit ("NMTC") financing arrangements are restricted for use and are classified on our consolidated balance sheet as other current assets. As of December 31, 2016, there remained \$13,780 restricted cash that is required to be used to fund the capital expenditures associated with the NMTC arrangements. The Company did not have any restricted cash balances related to NMTC arrangements as of December 31, 2015. The remainder of the Company's restricted cash balance outside of the NMTC arrangements is not significant. See Note 15 to these consolidated financial statements for further information.

Accounts Receivable and Allowance for Doubtful Accounts. Trade accounts receivable are recorded at the invoiced amount and do not bear interest. The allowance for doubtful accounts is the Company's best estimate of the amount of probable credit losses in its existing accounts receivable. A specific reserve for bad debt is recorded for known or suspected doubtful accounts receivable. For all other accounts, the Company recognizes a reserve for bad debt based on the length of time receivables are past due and historical write-off experience. Account balances are charged against the allowance when the Company believes it is probable that the associated receivables will not be recovered. If the financial condition of the Company's customers were to deteriorate resulting in an impairment of their ability to make payments, additional allowances may be required. The Company does not have any off-balance sheet credit exposure related to its customers. As of December 31, 2016 and 2015, the Company's allowance for doubtful accounts was not material.

Inventories. All inventories are stated at the lower of cost or market. Certain domestic inventories are valued using the last-in, first-out ("LIFO") method and all other inventories are valued using the weighted average cost or first-in, first-out ("FIFO") methods.

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Property, Plant and Equipment. Property, plant and equipment are carried at cost and include expenditures for new facilities, major renewals and betterments. The Company capitalizes the cost of furnace rebuilds as part of property, plant and equipment. Plant and equipment under capital leases are carried at the present value of minimum lease payments as determined at the beginning of the lease term. Maintenance, repairs and minor renewals are charged to expense as incurred. The Company capitalizes certain internal costs associated with the implementation of purchased software. When property, plant and equipment is retired or otherwise disposed of, the net carrying amount is eliminated with any gain or loss on disposition recognized in earnings at that time. The Company also leases property, plant and equipment, principally under operating leases. Rent expense for operating leases, which may have escalating rentals or rent holidays, is recorded on a straight-line basis over the respective lease terms.

Depreciation is provided on the straight-line method based on the estimated useful lives of the assets, which generally range from 15 to 33 years for buildings and improvements and 3 to 10 years for machinery and equipment. Leasehold improvements are depreciated using the straight-line method based on the shorter of the useful life of the improvement or remaining lease term.

The Company capitalizes the interest cost associated with the development and construction of significant new plant and equipment and depreciates that amount over the lives of the related assets. Capitalized interest recorded during the year ended December 31, 2016 was \$5,687 and was not material for the year ended December 31, 2015 or for the Successor or Predecessor Periods.

Spare Parts. Spare parts are maintained by the Company's facilities to keep machinery and equipment in working order. Spare parts are capitalized and included in other long-term assets. Spare parts are measured at cost and are not depreciated or expensed until utilized; however, reserves may be provided on aged spare parts. When a spare part is utilized as part of an improvement to property, plant and equipment, the carrying value is depreciated over the applicable life once placed in service. Otherwise, the spare part is expensed and charged as a cost of production when utilized.

Investments in Affiliated Companies. Investments in affiliated companies are accounted for using the equity method of accounting if the investment provides the Company with the ability to exercise significant influence, but not control, over the investee. Significant influence is generally deemed to exist if the Company's ownership interest in the voting stock of the investee ranges between 20% and 50%, although other factors, such as representation on the investee's board of directors and the impact of commercial arrangements, are considered in determining whether the equity method of accounting is appropriate. Under the equity method of accounting, the investments in equity-method investees are recorded in the consolidated balance sheets as investments in affiliated companies, and the Company's share of the investees' earnings or losses, together with other-than temporary impairments in value, is recorded as equity in net income from affiliated companies in the consolidated statements of operations. Any differences between the Company's cost of an equity method investment and the underlying equity in the net assets of the investment, such as fair value step-ups resulting from acquisitions, are accounted for according to their nature and impact the amounts recognized as equity in net income from affiliated companies in the consolidated statements of operations.

Goodwill and Intangible Assets. Goodwill is an asset representing the future economic benefits arising from other assets acquired in a business combination that are not individually identified and separately recognized. The Company is required to test goodwill associated with each of its reporting units for impairment at least annually and whenever events or circumstances indicate that it is more likely than not that goodwill may be impaired. The Company performs its annual goodwill impairment test as of October 1 of each year.

Goodwill is tested for impairment at the reporting unit level. In performing tests for goodwill impairment, the Company is permitted to first perform a qualitative assessment about the likelihood of the carrying value of a

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reporting unit exceeding its fair value. If an entity determines that it is more likely than not that the fair value of a reporting unit is less than its carrying amount based on the qualitative assessment, it is required to perform a two-step goodwill impairment test to identify the potential goodwill impairment and measure the amount of the goodwill impairment loss, if any, to be recognized for that reporting unit. However, if an entity concludes otherwise based on the qualitative assessment, the two-step goodwill impairment test is not required. The option to perform the qualitative assessment can be utilized at the Company's discretion, and the qualitative assessment need not be applied to all reporting units in a given goodwill impairment test. For an individual reporting unit, if the Company elects not to perform the qualitative assessment, or if the qualitative assessment indicates that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, then the Company must perform the two-step goodwill impairment test for the reporting unit.

In applying the two-step process, the first step used to identify potential impairment involves comparing the reporting unit's estimated fair value to its carrying value, including goodwill. If the estimated fair value of a reporting unit exceeds its carrying value, goodwill is not impaired. If the carrying value exceeds the estimated fair value, there is an indication of potential impairment and the second step is performed to measure the amount of impairment, if any. The second step of the process involves the calculation of an implied fair value of goodwill for each reporting unit for which step one indicated potential impairment. The implied fair value of goodwill is determined in a manner similar to how goodwill is calculated in a business combination. That is, the estimated fair value of the reporting unit, as calculated in step one, is allocated to the individual assets and liabilities as if the reporting unit was being acquired in a business combination. If the implied fair value of goodwill exceeds the carrying value of goodwill assigned to the reporting unit, there is no impairment. If the carrying value of goodwill assigned to a reporting unit exceeds the implied fair value of goodwill, an impairment charge is recorded to write down the carrying value. An impairment loss cannot exceed the carrying value of goodwill assigned to a reporting unit and the loss establishes a new basis in the goodwill. Subsequent reversal of an impairment loss is not permitted.

For intangible assets other than goodwill, definite-lived intangible assets are amortized over their respective estimated useful lives. Intangible assets with indefinite lives are not amortized, but rather are tested for impairment at least annually or more frequently if events occur or circumstances change that would more likely than not reduce the fair value of the intangible asset below its carrying amount. The Company tests its indefinite-lived intangible assets as of October 1 of each year in conjunction with its annual goodwill impairment test.

Impairment Assessment of Long-Lived Assets. The Company performs an impairment review of property, plant and equipment and definite-lived intangible assets when facts and circumstances indicate that the carrying value of an asset or asset group may not be recoverable from its undiscounted future cash flows. When evaluating long-lived assets for impairment, if the carrying amount of an asset or asset group is found not to be recoverable, a potential impairment loss may be recognized. An impairment loss is measured by comparing the carrying amount of the asset or asset group to its fair value. Fair value is determined using quoted market prices, when available, or other techniques including discounted cash flows. The Company's estimates of future cash flows involve assumptions concerning future operating performance, economic conditions and technological changes that may affect the future useful lives of the assets.

Derivative Financial Instruments. The Company utilizes certain derivative financial instruments to enhance its ability to manage risk, including exposure to interest rates and natural gas price fluctuations that exist as part of ongoing business operations. Derivative instruments are entered into for periods consistent with the related underlying exposures and do not constitute positions independent of those exposures.

All derivatives designated as hedges are recognized on the balance sheet at fair value. On the date a derivative contract is entered into, the Company may designate the derivative as a hedge of a forecasted

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transaction or as a hedge of the variability of cash flows to be received or paid related to a recognized asset or liability (cash-flow hedge). Changes in the fair value of a derivative that is highly effective and that is designated and qualifies as a cash-flow hedge are recorded in other comprehensive income (loss) to the extent that the derivative is effective as a hedge and until earnings are affected by the variability in cash flows of the designated hedged item. The ineffective portion is reported in earnings. Changes in the fair value of a derivative that is not designated or does not qualify as a cash-flow hedge are recorded in the consolidated statement of operations. Cash flows from derivative instruments are reported in the same cash-flow category as the cash flows from the items being hedged.

The Company formally documents all relationships between hedging instruments and hedged items, as well as its risk-management objective and strategy for undertaking various hedge transactions. This process includes relating all derivatives that are designated cash-flow hedges to underlying forecasted transactions. The Company also formally assesses whether each hedging relationship is highly effective in achieving offsetting changes in fair values or cash flows of the hedged item during the period both at the inception of the hedge and on an ongoing basis. If it is determined that a derivative is not highly effective as a hedge, or if a derivative ceases to be a highly-effective hedge, hedge accounting is discontinued with respect to that derivative prospectively.

Fair Value Measurements. The Company measures fair value using the guidelines under GAAP. An asset's fair value is defined as the price at which the asset could be exchanged in a current transaction between market participants. A liability's fair value is defined as the amount that would be paid to transfer the liability to a market participant, not the amount that would be paid to settle the liability with the creditor. See Note 4 to these consolidated financial statements regarding the application of fair value measurements.

The carrying values of cash, accounts receivable, accounts payable and accrued liabilities approximate fair value due to the short-term nature of these items. See Note 15 to these consolidated financial statements regarding the fair value of debt.

Revenue Recognition. Revenue, net of related discounts and allowances, is recognized when both title and risk of loss of the product have been transferred to the customer, the seller's price to the buyer is fixed or determinable, collectability is reasonably assured, and persuasive evidence of an arrangement exists. Customers take title and assume all the risks of ownership based on delivery terms, which are generally included in customer contracts of sale, order confirmation documents and invoices.

The Company recognizes rebates given to customers as a reduction of revenue based on an allocation of the cost of honoring rebates earned and claimed to each of the underlying revenue transactions that result in progress by the customer toward earning the rebate. Rebates are recognized at the time revenue is recorded. The Company measures the rebate obligation based on the estimated amount of sales that will result in a rebate at the adjusted sales price per the respective sales agreement.

Shipping and Handling Costs. Amounts billed to a customer in a sale transaction related to shipping and handling, if any, represent revenues earned for the goods provided and are classified as revenue. Costs related to shipping and handling of products shipped to customers are classified as cost of goods sold.

Research and Development. Research and development costs of \$7,266 for the year ended December 31, 2016 were expensed as incurred and reported in selling, general and administrative expenses in the consolidated statements of operations. There were no significant research and development costs incurred during the years ended December 31, 2015 or 2014.

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Income Taxes. Prior to the Business Combination, Eco Services was a single member limited liability company and was treated as a partnership for federal and state tax purposes. All income tax liabilities and/or benefits of the Company were passed through to the member. As such, no recognition of federal or state income taxes for the Company have been provided for tax periods prior to the Business Combination. As a result of the Business Combination, Eco Services had a change in tax status and is taxed as a C-Corporation. See Note 18 to these consolidated financial statements for discussion of income taxes during the predecessor period.

The Company operates within multiple taxing jurisdictions and is subject to tax filing requirements and audit within these jurisdictions. The Company uses the asset and liability method in accounting for income taxes. Deferred tax assets and liabilities are recorded for temporary differences between the tax basis of assets and liabilities and their reported amounts in the financial statements using statutory tax rates in effect for the year in which the differences are expected to reverse. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the results of operations in the period that includes the enactment date. A valuation allowance is recorded to reduce the carrying amounts of deferred tax assets unless it is more likely than not that those assets will be realized.

In determining the provision for income taxes, the Company provides deferred income taxes on income from foreign subsidiaries as such earnings are taxable upon remittance to the United States. The Company establishes contingent liabilities for possible assessments by taxing authorities resulting from uncertain tax positions including, but not limited to, transfer pricing, deductibility of certain expenses and other state, local and foreign tax matters. The Company recognizes a financial statement benefit for positions taken for tax return purposes when it will be more-likely-than-not that the positions will be sustained. The Company recognizes potential accrued interest and penalties related to unrecognized tax benefits in income tax expense. Tax examinations are often complex as tax authorities may disagree with the treatment of items reported by the Company and may require several years to resolve. These accrued liabilities represent a provision for taxes that are reasonably expected to be incurred on the basis of available information but which are not certain.

Asset Retirement Obligations. The Company records a liability when the fair value of any future obligation to retire a long-lived asset as a result of an existing or enacted law, statute, ordinance or contract is reasonably estimable. The Company also records a liability for the fair value of a conditional asset retirement obligation if the fair value can be reasonably estimated. When the liability is initially recorded, the Company capitalizes the cost by increasing the amount of the related long-lived asset. Over time, the Company adjusts the liability to its present value by recognizing accretion expense as an operating expense in the consolidated statement of operations each period, and the capitalized cost is depreciated over the useful life of the related asset. Upon settlement of the liability, the Company records a gain or loss if the actual costs differ from the accrued amount.

The Company has recorded asset retirement obligations (“AROs”) identified as part of the Business Combination in other long-term liabilities in order to recognize legal obligations associated with the retirement of tangible long-lived assets. The Company has assessed whether an ARO is required at each manufacturing facility and has recorded an obligation for those locations for which an obligation exists. The most significant of these are primarily attributable to environmental remediation liabilities associated with current operations that were incurred during the course of normal operations. The Company has AROs that are conditional in nature. The Company identified certain conditional AROs upon which it was able to reasonably estimate their fair value and recorded a liability. These AROs were triggered upon commitments by the Company to comply with local, state, and national laws to remove environmentally hazardous materials. The AROs have been recognized on a discounted basis using a credit adjusted risk free rate. Accretion of the AROs is recorded in other operating expense, net in the

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Company's consolidated statements of operations and amounted to \$177 for the year ended December 31, 2016. Following are changes in the Company's ARO liability during the year ended December 31, 2016:

	Year ended December 31, 2016
Beginning balance	\$ —
AROs identified as part of the Business Combination	3,687
Accretion expense	177
Foreign exchange impact	(164)
Ending balance	<u>\$ 3,700</u>

Environmental Expenditures. Environmental expenditures that pertain to current operations or to future revenues are expensed or capitalized consistent with the Company's capitalization policy for property, plant and equipment. Expenditures that result from the remediation of an existing condition caused by past operations and that do not contribute to current or future revenues are expensed. Liabilities are recognized for remedial activities when the remediation is probable and the cost can be reasonably estimated. Recoveries of expenditures for environmental remediation are recognized as assets only when recovery is deemed probable. See Note 22 to these consolidated financial statements regarding commitments and contingencies, and Note 14 regarding the accrued environmental reserve.

Deferred Financing Costs. Financing costs incurred in connection with the issuance of long-term debt are deferred and presented as a direct reduction from the related debt instruments on the Company's consolidated balance sheet. Deferred financing costs are amortized as interest expense using the effective interest method over the respective terms of the associated debt instruments.

Stock-Based Compensation. The Company applies the fair value based method to account for stock options and awards. See Note 21 to these consolidated financial statements regarding compensation expense associated with stock options and awards.

Pensions and Postretirement Benefits. The Company maintains qualified and non-qualified defined benefit pension plans that cover employees in the United States and Canada, as well as certain employees in other international locations. Benefits for a majority of the plans are based on average final pay and years of service. Our funding policy, consistent with statutory requirements, is based on actuarial computations utilizing the projected unit credit method of calculation. Not all defined benefit pension plans are funded. In the United States and Canada, the pension plans' assets include equity and fixed income securities. In our other international locations, the pension plans' assets include equity and fixed income securities, as well as insurance policies. Certain assumptions are made regarding the occurrence of future events affecting pension costs, such as mortality, withdrawal, disablement and retirement, changes in compensation and benefits, and discount rates to reflect the time value of money.

The major elements in determining pension income and expense are pension liability discount rates and the expected return on plan assets. The Company references rates of return on high-quality, fixed income investments when estimating the discount rate, and the expected period over which payments will be made based upon historical experience. The long-term rate of return used to calculate the expected return on plan assets is the average rate of return estimated to be earned on invested funds for providing pension benefits.

In addition to pension benefits, the Company provides certain health care benefits for employees who meet age, participation and length of service requirements at retirement. The Company uses explicit assumptions using

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the best estimates available of the plan's future experience. Principal actuarial assumptions include: discount rates, present value factors, retirement age, participation rates, mortality rates, cost trend rates, Medicare reimbursement rates and per capita claims cost by age. Current interest rates, as of the measurement date, are used for discount rates in present value calculations.

The Company also has defined contribution plans covering domestic employees of the Company and certain subsidiaries.

Contingencies. Certain conditions may exist as of the date the financial statements are issued, which may result in a loss to the Company but which will only be resolved when one or more future events occur or fail to occur. The Company's management and its legal counsel assess such contingent liabilities, and such assessment inherently involves an exercise of judgment. In assessing loss contingencies related to legal proceedings that are pending against the Company or unasserted claims that may result in such proceedings, the Company and legal counsel evaluate the perceived merits of any legal proceedings or unasserted claims as well as the perceived merits of the amount of relief sought or expected to be sought therein. If the assessment of a contingency indicates that it is probable that a loss has been incurred and the amount of the liability can be estimated, then the estimated liability is accrued in the Company's financial statements. If the assessment indicates that a loss contingency is not probable, but is reasonably possible, or is probable but cannot be estimated, then the nature of the contingent liability, together with an estimate of the range of possible loss if determinable and material, would be disclosed. Loss contingencies considered remote are generally not disclosed unless they involve guarantees, in which case the nature of the guarantee would be disclosed, including the approximate term, how the guarantee arose, and the events or circumstances that would require the guarantor to perform under the guarantee.

Use of Estimates. The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Reclassifications. As a result of the Business Combination, certain reclassifications have been made to the historical financial statements of Eco Services included in the consolidated financial statements to conform to the current presentation.

3. Recently Issued Accounting Standards:

In March 2017, the Financial Accounting Standards Board ("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 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

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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 December 31, 2016, the Company had \$13,780 of restricted cash on its balance sheet related to its NMTC arrangements (see Note 15 to these consolidated financial statements for further information).

In October 2016, the FASB issued guidance which eliminates the deferral of the tax effects of intra-entity transfers of an asset other than inventory. Current GAAP prohibits the recognition of current and deferred income taxes for an intra-entity asset transfer until the asset has been sold to an outside party 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.

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.

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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. 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 significant 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 has made an accounting policy election under the new guidance to account for forfeitures of stock-based compensation awards as they occur.

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.

In September 2015, the FASB issued guidance that changes the requirements for reporting measurement period adjustments to provisional amounts initially recognized in conjunction with a business combination. GAAP previously required an acquiring entity to retrospectively adjust, in prior period financial statements, the provisional amounts to reflect new information obtained during the measurement period (a period, which may not exceed one year from the date of the business combination, during which the acquiring entity may receive information about the facts and circumstances existing as of the acquisition date that, if known, would have affected the measurement of the amounts recognized as of the acquisition date). Under the new guidance, adjustments to the provisional amounts are reflected in the financial statements for the reporting period in which the adjustments are determined, including by recognizing in current period earnings the full effect of changes in depreciation, amortization or other income effects. The guidance requires that the acquiring entity either present separately on the face of the current period income statement or disclose in the notes to the current period financial statements, by line item, the amounts of the adjustments made during the current period. The Company early adopted the guidance as of December 31, 2015, with prospective application as required. The only business combination to occur since the adoption date was the Business Combination (see Note 7 to these consolidated financial statements for further information). As of December 31, 2016, the measurement period was substantially complete, and because the Business Combination occurred during the year ended December 31, 2016, there were no adjustments to provisional amounts to report for the period of May 4, 2016, the date of the Business Combination, through December 31, 2016 that would have impacted a prior reporting period, since all amounts recorded in the consolidated financial statements as of and for the year ended December 31, 2016 reflect the final valuation.

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

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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 prices 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 significant impact on the Company's consolidated financial statements.

In August 2014, the FASB issued guidance regarding management's responsibility to evaluate whether there is substantial doubt about an entity's ability to continue as a going concern within one year of the issuance of the financial statements. If substantial doubt exists, additional disclosures are required. This guidance was effective for the Company starting with the year ended December 31, 2016, and is effective for annual and interim periods thereafter. The adoption of the guidance did not have an impact on the Company's disclosure in the notes to its consolidated financial statements.

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 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 has not yet determined whether the guidance will have a significant 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 does not anticipate adopting the new guidance early, nor has it completed its determination of whether it will implement the guidance under the retrospective or modified retrospective transition methods of adoption.

4. Fair Value Measurements:

Fair values are based on quoted market prices when available. When market prices are not available, fair value is 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 value 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 which 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

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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 December 31, 2016 and indicates the fair value hierarchy of the valuation techniques the Company utilized to determine such fair value. There were no assets or liabilities measured at fair value on a recurring basis as of December 31, 2015.

	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>

The following table presents information about the Company’s assets and liabilities that were measured at fair value on a non-recurring basis as of December 31, 2016. Refer to Note 13 to these consolidated financial statements for a description of the valuation techniques the Company utilized to determine such fair value. There were no assets or liabilities measured at fair value on a non-recurring basis as of December 31, 2015.

	As of December 31, 2016	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total Losses
Assets:					
Indefinite life tradenames(1)	\$ —	\$ —	\$ —	\$ 153,922	\$(6,873)
Total	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 153,922</u>	<u>\$(6,873)</u>

- (1) Indefinite life tradenames with a carrying amount of \$160,795, net of foreign exchange impact, were written down to their implied fair value of \$153,922 as part of the Company’s annual impairment assessment on October 1, 2016. This resulted in an impairment charge of \$6,873, which was recorded to other operating expense, net, on the consolidated statements of operations.

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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 19 to these 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 that 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 December 31, 2016, the credit valuation adjustment resulted in a minimal change in the fair value of the derivatives.

5. Accumulated Other Comprehensive Income (Loss):

The following table presents the components of accumulated other comprehensive income (loss), net of tax, as of December 31, 2016 and 2015:

	December 31,	
	2016	2015
Amortization and unrealized gains on pension and postretirement plans, net of tax of (\$4,799) and \$0	\$ 7,513	\$ 648
Net changes in fair values of derivatives, net of tax of (\$2,793)	4,557	—
Foreign currency translation adjustments, net of tax of (\$6,627)	(65,781)	—
Accumulated other comprehensive income (loss)	<u>\$ (53,711)</u>	<u>\$ 648</u>

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The following table presents the tax effects of each component of other comprehensive income (loss) for the years ended December 31, 2016 and 2015 (no other comprehensive income was noted for the Predecessor and Successor Periods during the year ended December 31, 2014):

	Years ended December 31,					
	2016			2015		
	Pre-tax amount	Tax benefit / (expense)	After-tax amount	Pre-tax amount	Tax benefit / (expense)	After-tax amount
Defined benefit and other postretirement plan						
Amortization and unrealized gains	\$ 11,664	\$ (4,799)	\$ 6,865	\$ 648	\$ —	\$ 648
Benefit plans, net	11,664	(4,799)	6,865	648	—	648
Net gain from hedging activities	7,350	(2,793)	4,557	—	—	—
Foreign currency translation	(60,207)	(6,627)	(66,834)	—	—	—
Other comprehensive income (loss)	<u>\$ (41,193)</u>	<u>\$ (14,219)</u>	<u>\$ (55,412)</u>	<u>\$ 648</u>	<u>\$ —</u>	<u>\$ 648</u>

The following table presents the change in accumulated other comprehensive income (loss), net of tax, by component for the years ended December 31, 2016 and 2015:

	Defined benefit and other postretirement plans	Net gain (loss) from hedging activities	Foreign currency translation	Total
December 31, 2014	\$ —	\$ —	\$ —	\$ —
Other comprehensive income (loss) before reclassifications	648	—	—	648
Amounts reclassified from accumulated other comprehensive income ⁽¹⁾	—	—	—	—
Net current period other comprehensive income (loss)	648	—	—	648
December 31, 2015	\$ 648	\$ —	\$ —	\$ 648
Other comprehensive income (loss) before reclassifications	6,844	3,669	(65,781)	(55,268)
Amounts reclassified from accumulated other comprehensive income ⁽¹⁾	21	888	—	909
Net current period other comprehensive income (loss)	6,865	4,557	(65,781)	(54,359)
December 31, 2016	<u>\$ 7,513</u>	<u>\$ 4,557</u>	<u>\$ (65,781)</u>	<u>\$ (53,711)</u>

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

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The following table presents the reclassifications out of accumulated other comprehensive income (loss) for the years ended December 31, 2016 and 2015. Amounts in parentheses indicate debits to profit/loss.

<u>Details about Accumulated Other Comprehensive Income Components</u>	<u>Amount Reclassified from Accumulated Other Comprehensive Income</u>		<u>Affected Line Item in the Statement Where Net Income is Presented</u>
	<u>Years ended December 31,</u>		
	<u>2016</u>	<u>2015</u>	
Defined benefit and other postretirement plans			
Amortization of prior service cost	\$ —	\$ —	(2)
Amortization of net gain (loss)	26	—	(2)
	26	—	Total before tax
	(5)	—	Tax (expense) benefit
	<u>\$ 21</u>	<u>\$ —</u>	Net of tax
Net gain (loss) from hedging activities			
Interest rate caps	\$ —	\$ —	Interest expense
Natural gas swaps	1,433	—	Cost of goods sold
	1,433	—	Total before tax
	(545)	—	Tax (expense) benefit
	<u>\$ 888</u>	<u>\$ —</u>	Net of tax
Total reclassifications for the period	<u>\$ 909</u>	<u>\$ —</u>	Net of tax

(2) These accumulated other comprehensive income (loss) components are included in the computation of net periodic pension cost (see Note 19 to these consolidated financial statements for further information).

6. 2014 Acquisition

As described in Note 1 to these consolidated financial statements, on July 30, 2014, Eco Services entered into the 2014 Acquisition with Solvay, 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 business unit, which constitutes the Eco Services business after the 2014 Acquisition. The 2014 Acquisition closed on December 1, 2014 (the "Closing Date").

The purchase price for Eco was \$890,000 in cash, subject to adjustment for certain items, including the actual level of working capital at the closing of the 2014 Acquisition, and a defined contribution plan adjustment. The working capital and defined contribution plan adjustments to the purchase price resulted in a reduction to the purchase price by \$8,525 to \$881,475 and were settled with Solvay as of June 30, 2015. Acquisition costs of \$14,666 are included in other operating expense, net in the Company's consolidated statement of operations for the Successor Period.

The 2014 Acquisition and related transactions were funded with the proceeds of the following transactions:

Senior Secured Credit Facilities

Concurrent with the consummation of the 2014 Acquisition, Eco Services entered into senior secured credit facilities, which consisted of a \$500,000 seven-year term loan facility, all of which was drawn on the Closing

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Date, and a \$55,000 five-year revolving credit facility. See Note 15 to these consolidated financial statements for a more detailed description of Eco Services' senior secured credit facilities.

Senior Notes

Concurrent with the consummation of the 2014 Acquisition, Eco Services issued \$200,000 in aggregate principal amount of senior notes. See Note 15 to these consolidated financial statements for a more detailed description of Eco Services' senior unsecured notes.

Equity Investment

In connection with the 2014 Acquisition, affiliates of CCMP contributed \$230,000 in cash and members of Eco Services' board of managers and management contributed \$9,885 in cash.

The 2014 Acquisition was accounted for using the acquisition method of accounting. Under the acquisition method, the purchase price was allocated to Solvay's Eco business unit's net assets acquired based on the fair values of the assets acquired and the liabilities assumed as of the Closing Date. The excess of the purchase price over the fair values of these net assets was recorded as goodwill.

The following table sets forth the calculation and final allocation of the purchase price to the net assets acquired with respect to the 2014 Acquisition, which was finalized in 2015:

Total purchase price	<u>\$ 881,475</u>
Recognized amounts of identifiable assets acquired and liabilities assumed:	
Receivables	\$ 26,160
Other receivables	19,389
Inventories	13,297
Prepaid expenses	377
Property, plant and equipment	471,367
Intangibles, excluding goodwill	148,190
Other long-term assets	<u>1,624</u>
Fair value of assets acquired	680,404
Accounts payable	(20,908)
Other payables	(853)
Current portion of capital lease obligation	(236)
Accrued expenses	(8,710)
Accrued wages, salaries & employment benefits	(9,572)
Other current liabilities	(6,485)
Long-term portion of capital lease obligation	(1,185)
Environmental reserve	(4,783)
Supply contract obligation	(25,662)
Pension liability	<u>(32,427)</u>
Fair value of net assets acquired	569,583
Goodwill	<u>311,892</u>
Purchase price	<u>\$ 881,475</u>

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The Company believes that the expected revenue of Eco Services, the assembled workforce and several strategic benefits, including a comprehensive portfolio of brands, contributed to a total purchase price that resulted in the recognition of goodwill. Goodwill recognized as a result of the 2014 Acquisition is not deductible for income tax purposes.

The valuation of the intangible assets acquired and the related weighted-average amortization periods are as follows:

	<u>Amount</u>	<u>Weighted-Average Expected Useful Life (in years)</u>
Intangible assets subject to amortization:		
Customer relationships	\$ 99,300	15
Technical know-how	24,990	14
Permits	9,100	5
Total intangible assets subject to amortization	<u>133,390</u>	
Tradename, not subject to amortization	14,800	Indefinite
Total	<u>\$148,190</u>	

7. Business Combination:

As described in Note 1 to these 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 financial statements are the continuation of Eco Services' business prior to the Business Combination.

The Business Combination was accounted for using the acquisition method of accounting. Under the acquisition method, the purchase price is allocated to PQ Holdings' net assets acquired based on the fair values of assets acquired and liabilities assumed as of the acquisition date. The excess of the purchase price over the fair values of these net assets is recorded as goodwill.

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The following table sets forth the calculation and allocation of the purchase price to the net assets acquired with respect to the Business Combination, which was substantially complete as of December 31, 2016.

Total consideration, net of cash acquired	<u>\$ 2,689,941</u>
Recognized amounts of identifiable assets acquired and liabilities assumed:	
Receivables	\$ 161,110
Inventories	254,770
Prepaid and other current assets	19,295
Investments in affiliated companies	472,994
Property, plant and equipment	683,673
Other intangible assets	754,000
Other long-term assets	<u>48,127</u>
Fair value of assets acquired	2,393,969
Revolver, notes payable & current debt	(2,441)
Accounts payable	(93,222)
Accrued liabilities	(98,621)
Long-term debt	(20,470)
Deferred income taxes	(327,296)
Other long-term liabilities	(113,936)
Noncontrolling interest	<u>(6,569)</u>
Fair value of net assets acquired	1,731,414
Goodwill	<u>958,527</u>
	<u>\$ 2,689,941</u>

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 (see Note 15 to these consolidated financial statements for further information). Acquisition costs of \$1,583 are included in other operating expense, net in the Company's consolidated statement of operations for the year ended December 31, 2016.

The Company believes that its diverse range of industrial, consumer and governmental applications in which its products are used were the primary reasons that contributed to a total purchase price that resulted in the recognition of goodwill. The goodwill associated with the Business Combination is not deductible for tax purposes.

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The valuation of the intangible assets acquired and the related weighted-average amortization periods are as follows:

	<u>Amount</u>	<u>Weighted-Average Expected Useful Life (in years)</u>
Intangible assets subject to amortization:		
Trademarks	\$ 35,400	15.0
Technical know-how	189,300	20.0
Contracts	19,800	5.3
Customer relationships	268,700	10.6
In-process research and development	<u>6,800</u>	
Total intangible assets subject to amortization	520,000	
Tradenames, not subject to amortization	151,100	Indefinite
Trademarks, not subject to amortization	82,900	Indefinite
Total	<u>\$754,000</u>	

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 \$29,086 for the year ended December 31, 2016 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 (see Note 9 to these consolidated financial statements for further information).

The Company's consolidated financial statements include PQ Holdings' results of operations from May 4, 2016, the date of the Business Combination, through December 31, 2016. Net sales and operating income attributable to PQ Holdings' during this period are included in the Company's consolidated financial statements for the year ended December 31, 2016 and total \$690,459 and \$17,991, respectively.

Pro Forma Financial Information

The unaudited pro forma information has been derived from the Company's historical consolidated financial statements and has been 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 depreciation expense on stepped up fixed assets, amortization of acquired intangibles, cost of goods sold expense related to the sale of stepped up inventory, interest expense related to additional debt that would be 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 and are not indicative of the Company's actual consolidated results of operations or consolidated financial position. The unaudited pro forma results of operations do not reflect any operating efficiencies or potential cost savings which may result from the acquisitions.

	<u>Years ended December 31,</u>	
	<u>2016</u>	<u>2015</u>
	(unaudited)	
Pro forma sales	\$ 1,403,041	\$ 1,413,201
Pro forma net loss	(76,994)	(120,982)

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Included in the pro forma net loss are adjustments to allocate charges incurred during the year ended December 31, 2016 to December 31, 2015. These non-recurring charges include a debt prepayment penalty of \$26,250, one-time refinancing charges of \$4,747 and transaction fee charges of \$1,795 that are each reflected in the pro forma net loss for the year ended December 31, 2015.

8. Other Operating Expense, Net:

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

	Years ended December 31,		Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
	2016	2015		
Amortization expense	\$25,263	\$ 6,605	\$ 552	\$ 5,806
Transaction and other related costs ⁽¹⁾	4,952	4,241	15,506	—
Restructuring and other related costs (Note 23)	12,630	4,147	247	—
Net loss on asset disposals	4,216	3,911	—	—
Intangible asset impairment charge (Note 13)	6,873	—	—	—
Management advisory fees (Note 26)	3,584	590	42	—
Environmental-related costs (benefits) (Note 22)	1,352	202	—	(213)
Other, net	3,431	—	—	—
	<u>\$62,301</u>	<u>\$19,696</u>	<u>\$ 16,347</u>	<u>\$ 5,593</u>

(1) Transaction and other related costs primarily include acquisition costs directly attributable to the Business Combination (see Note 7 to these consolidated financial statements for further information) and the 2014 Acquisition (see Note 6), as well as other business development costs.

9. Inventories:

Inventories were classified and valued as follows:

	December 31,	
	2016	2015
Finished products and work in process	\$ 175,182	\$ 8,820
Raw materials	51,866	1,359
	<u>\$ 227,048</u>	<u>\$ 10,179</u>
Valued at lower of cost or market:		
LIFO basis	\$ 135,605	\$ —
FIFO or average cost basis	91,443	10,179
	<u>\$ 227,048</u>	<u>\$ 10,179</u>

The domestic inventory acquired as part of the Business Combination is valued based on the LIFO method. Therefore, the fair value allocated to the acquired LIFO inventory was treated as the new base inventory value. If inventories valued under the LIFO basis had been valued using the FIFO method, inventories would have been \$30,338 lower than reported as of December 31, 2016, driven primarily by the purchase accounting fair value

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step-up of the LIFO inventory base value associated with the Business Combination. As of December 31, 2016, inventory quantities for one of the Company's LIFO pools were reduced below their levels at the Business Combination date. As a result of this reduction, LIFO inventory costs charged to cost of goods sold were computed based on the lower base layer costs at the Business Combination date. The impact on cost of goods sold and net income for the year ended December 31, 2016 was not material.

10. Investments in Affiliated Companies:

As a result of the Business Combination, the Company acquired investments in affiliated companies accounted for under the equity method. Affiliated companies accounted for on the equity method as of December 31, 2016 are as follows:

<u>Company</u>	<u>Country</u>	<u>Percent Ownership</u>
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:

	<u>December 31,</u>	
	<u>2016</u>	<u>2015</u>
Current assets	\$ 207,997	\$ —
Noncurrent assets	212,144	—
Current liabilities	44,741	—
Noncurrent liabilities	1,384	—

	<u>Period from May 4, 2016 to December 31, 2016</u>
Net sales	\$ 206,072
Gross profit	91,761
Operating income	67,098
Net income	67,332

The Company's investments in affiliated companies balance as of December 31, 2016 includes net purchase accounting fair value adjustments of \$273,300 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 \$36,296 of amortization expense related to purchase accounting fair value adjustments for the year ended December 31, 2016.

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The following table summarizes the activity related to the Company's investments in affiliated companies balance on the consolidated balance sheet:

	Year ended December 31, 2016
Balance at beginning of period	\$ —
PQ/Eco Merger	472,994
Equity in net income of affiliated companies	33,684
Charges related to purchase accounting fair value adjustments	(36,296)
Dividends received	(7,636)
Foreign currency translation adjustments	(3,340)
Balance at end of period	<u>\$ 459,406</u>

The Company had net receivables due from affiliates of \$4,196 as of December 31, 2016, which are included in prepaid and other current assets. Net receivables due from affiliates are generally non-trade receivables. Sales to affiliates were \$1,587 for the year ended December 31, 2016. The Company purchased goods of \$1,147 from affiliates, which is included in cost of goods sold during the year ended December 31, 2016.

On December 18, 2013, PQ Holdings and its joint venture, Zeolyst International, entered into a real estate tax abatement agreement with the Unified Government of Wyandotte County and Kansas City, Kansas that will utilize an Industrial Revenue Bond financing structure to achieve a 75% real estate tax abatement on the value of the improvements that will be constructed during the expansion of PQ Holdings and Zeolyst International's facilities at the jointly-operated Kansas City, Kansas plant. The financing obligation and the industrial bond receivable have been presented net, as the financing obligation and the industrial bond meet the criteria for right of setoff conditions as prescribed in ASC 210-20-45.

11. Property, Plant and Equipment:

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

	December 31,	
	2016	2015
Land	\$ 186,327	\$ 108,197
Buildings and improvements	157,944	11,083
Machinery and equipment	788,175	362,917
Construction in progress	204,138	29,581
	<u>1,336,584</u>	<u>511,778</u>
Less: accumulated depreciation	<u>(155,196)</u>	<u>(30,705)</u>
	<u>\$ 1,181,388</u>	<u>\$ 481,073</u>

Depreciation expense was \$89,453 and \$28,790 for the years ended December 31, 2016 and 2015, respectively, and \$2,103 and \$33,171 for the Successor and Predecessor Periods of 2014, respectively.

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12. Reportable Segments and Geographical Information:

The Company has organized its business around two operating segments based on the review of discrete financial results for each of the operating segments by the Company's chief operating decision maker (the Company's President and Chief Executive Officer), or CODM, for performance assessment and resource allocation purposes. Each of the Company's operating segments represents a reportable segment under GAAP. The Company's reportable segments are organized based on the nature and economic characteristics of the Company's products. The Company's two reportable segments are Performance Materials and Chemicals ("PM&C") and Environmental Catalysts and Services ("EC&S").

The PM&C segment is a silicates and specialty materials producer with leading supply positions for the majority of its products sold in North America, Europe, South America, Australia and Asia (excluding China) serving end markets such as personal and industrial cleaning products, fuel efficient tires (or green tires), surface coatings, and food and beverage. The two product groups included in the PM&C segment are performance materials and performance chemicals. The EC&S segment is a leading global innovator and producer of catalysts for the refinery, emissions control, and petrochemical markets and is also a leading provider of catalyst recycling services to the North American refining market. The three product groups included in the EC&S segment are silica catalysts, zeolyst catalysts, and refining services. The EC&S segment includes equity in net income from Zeolyst International and Zeolyst C.V. (collectively, the "Zeolyst Joint Venture"), each of which are 50/50 joint ventures with CRI Zeolites, Inc. (a wholly-owned subsidiary of Royal Dutch Shell). The Zeolyst Joint Venture is accounted for using the equity method in the Company's consolidated financial statements (see Note 10 to these consolidated financial statements for further information). Company management evaluates the EC&S segment's performance, including the Zeolyst Joint Venture, on a proportionate consolidation basis. Accordingly, the revenues and expenses used to compute the EC&S segment's adjusted earnings before interest, income taxes, depreciation and amortization ("Adjusted EBITDA") include the Zeolyst Joint Venture's results of operations on a proportionate basis based on the Company's 50% ownership level. Since the Company uses the equity method of accounting for the Zeolyst Joint Venture, these items are eliminated when reconciling to the Company's consolidated results of operations.

The Company's management evaluates the operating results of each reportable segment based upon Adjusted EBITDA. Adjusted EBITDA consists of EBITDA, which is a measure defined as net income before depreciation and amortization, interest expense and income taxes (each of which is included in the Company's consolidated statements of operations), and adjusted for certain items as discussed below.

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Summarized financial information for the Company's reportable segments and product groups is shown in the following table:

	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31, 2014	Predecessor period from January 1, 2014 to November 30, 2014
	2016	2015		
Net sales:				
Performance Materials & Chemicals:				
Performance Chemicals	\$ 437,523	\$ —	\$ —	\$ —
Performance Materials	201,428	—	—	—
Subtotal	638,951	—	—	—
Environmental Catalysts & Services:(1)				
Silica Catalysts	53,029	—	—	—
Refining Services	373,718	388,875	35,539	361,823
Subtotal	426,747	388,875	35,539	361,823
Eliminations(2)	(1,521)	—	—	—
Total	<u>\$1,064,177</u>	<u>\$388,875</u>	<u>\$ 35,539</u>	<u>\$ 361,823</u>
Segment Adjusted EBITDA:(3)				
Performance Materials & Chemicals	\$ 158,679	\$ —	\$ —	
Environmental Catalysts & Services(4)	196,825	117,704	9,122	
Total Segment Adjusted EBITDA(5)	<u>\$ 355,504</u>	<u>\$117,704</u>	<u>\$ 9,122</u>	

- (1) Excludes the Company's proportionate share of sales from the Zeolyst Joint Venture, which represents the Company's zeolite catalysts product group. The proportionate share of sales included in the EC&S segment is \$94,516 for the year ended December 31, 2016.
- (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 performance. Adjusted EBITDA as defined by the Company may not be comparable with EBITDA or Adjusted EBITDA as defined by other companies.
- (4) The equity in net income included in the EC&S segment is \$33,518 for the Zeolyst Joint Venture for the year ended December 31, 2016.
- (5) Total Segment Adjusted EBITDA differs from the Company's consolidated Adjusted EBITDA due to unallocated corporate expenses.

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

	Years ended December 31,		Successor Period from inception (July 30, 2014) to December 31, 2014	Predecessor Period from January 1, 2014 to November 30, 2014
	2016	2015		
(Dollars in thousands, except per share data)				
Reconciliation of net income (loss) attributable to PQ Group Holdings Inc. to Segment Adjusted EBITDA				
Net income (loss) attributable to PQ Group Holdings Inc.	\$ (79,746)	\$ 11,427	\$ (22,061)	\$ 30,545
Provision (benefit) for income taxes	10,041	—	—	14,602
Interest expense, net	140,315	44,348	8,470	86
Depreciation and amortization	128,288	38,999	2,955	42,458
Segment EBITDA	<u>\$198,898</u>	<u>\$ 94,774</u>	<u>\$ (10,636)</u>	<u>\$ 87,691</u>
Unallocated corporate expenses	23,971	—	—	—
Investments in affiliate and inventory step-up amortization	65,382	—	3,511	—
Impairment of fixed assets, intangibles and goodwill	6,873	—	—	—
Debt extinguishment costs	13,782	—	—	—
Losses on disposal of fixed assets	4,216	3,911	—	—
Foreign currency exchange (gains) losses	(3,558)	—	—	—
Non-cash revaluation of inventory, including LIFO	1,310	—	—	—
Management advisory fees	3,583	590	42	—
Transaction and other related costs	4,664	4,241	15,506	—
Equity-based and other non-cash compensation	7,042	2,256	—	—
Restructuring, integration and business optimization expenses	16,258	4,147	247	—
Defined benefit plan pension cost	1,375	2,903	—	—
Joint venture depreciation, amortization and interest	6,920	—	—	—
Abatement revenue	—	—	—	—
Corporate allocations	—	—	—	—
Estimated standalone costs	—	—	—	—
Retention bonus adjustment	—	—	—	—
Plant production—one-time	—	—	—	—
Contract adjustments	—	—	—	—
Other ⁽¹⁾	4,788	4,882	452	—
Segment Adjusted EBITDA	<u><u>\$355,504</u></u>	<u><u>\$117,704</u></u>	<u><u>\$ 9,122</u></u>	<u><u>\$ —</u></u>

(1) Other includes certain legal and environmental costs and other charges as capital taxes, asset retirement obligation accretion and other expenses.

The Company's consolidated results include equity in net loss from affiliated companies of \$2,612 for the year ended December 31, 2016. This is primarily comprised of equity in net income of \$33,518 in the EC&S segment from the Zeolyst Joint Venture for the year ended December 31, 2016. The remaining equity in net income for the Company is included in the PM&C segment, which is attributed to smaller investments and was not material. The Company's equity in net income from affiliates was more than offset by \$36,296 of amortization expense related to purchase accounting fair value adjustments associated with the Zeolyst Joint

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Venture for the year ended December 31, 2016 as a result of the Business Combination valuation. This portion of the Company's consolidated equity in net loss from affiliated companies is reflected in the "Corporate and Eliminations" line item of the Company's segment reconciliation of Adjusted EBITDA.

Capital expenditures for the Company's reportable segments are shown in the following table:

	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31, 2014	Predecessor period from January 1, 2014 to November 30, 2014
	2016	2015		
Capital expenditures:				
Performance Materials & Chemicals	\$ 74,392	\$ —	\$ —	\$ —
Environmental Catalysts & Services ⁽¹⁾	74,921	41,854	2,892	32,690
Eliminations ⁽¹⁾	(19,001)	—	—	—
Total	<u>\$130,312</u>	<u>\$41,854</u>	<u>\$ 2,892</u>	<u>\$ 32,690</u>
Change in non-cash capital expenditures in A/P	(8,891)	(860)	—	—
Capital expenditures per the consolidated statement of cash flows	<u>\$121,421</u>	<u>\$40,994</u>	<u>\$ 2,892</u>	<u>\$ 32,690</u>

(1) Includes the Company's proportionate share of capital expenditures from the Zeolyst Joint Venture. The proportionate share of capital expenditures included in the EC&S segment is \$19,001 for the Zeolyst Joint Venture for the year ended December 31, 2016. These capital expenditures are in turn removed in the "Eliminations" line item to reconcile to the Company's consolidated capital expenditures.

Total assets by segment are not disclosed by the Company because the information is not prepared or used by the CODM to assess performance and to allocate resources.

Net sales and long-lived assets by geographic area are presented in the following tables. Net sales are attributed to countries based upon location of products shipped.

	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31, 2014	Predecessor period from January 1, 2014 to November 30, 2014
	2016	2015		
Net sales ⁽¹⁾ :				
United States	\$ 705,348	\$388,875	\$ 35,539	\$ 361,823
Netherlands	79,821	—	—	—
United Kingdom	67,494	—	—	—
Other foreign countries	211,514	—	—	—
Total	<u>\$1,064,177</u>	<u>\$388,875</u>	<u>\$ 35,539</u>	<u>\$ 361,823</u>

(1) Except for the United States, no sales in an individual country exceeded 10% of the Company's total net sales.

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	December 31,	
	2016	2015
Long-lived assets(1):		
United States	\$ 2,870,958	\$ 936,111
Netherlands	288,239	—
United Kingdom	228,924	—
Other foreign countries	378,872	—
Total	<u>\$ 3,766,993</u>	<u>\$ 936,111</u>

(1) Long-lived assets exclude intercompany notes receivable and deferred tax assets.

13. Goodwill and Other Intangible Assets:

The changes in the carrying amount of goodwill for the years ended December 31, 2016 and 2015 are summarized as follows:

	Performance Materials & Chemicals	Environmental Catalysts & Services	Total
Balance as of January 1, 2016	\$ —	\$ 311,892	\$ 311,892
Goodwill recognized	876,844	81,683	958,527
Foreign exchange impact	(24,338)	(4,652)	(28,990)
Balance as of December 31, 2016	<u>\$ 852,506</u>	<u>\$ 388,923</u>	<u>\$ 1,241,429</u>
	Performance Materials & Chemicals	Environmental Catalysts & Services	Total
Balance as of January 1, 2015	\$ —	\$ 310,191	\$ 310,191
Goodwill adjustment	—	1,701	1,701
Balance as of December 31, 2015	<u>\$ —</u>	<u>\$ 311,892</u>	<u>\$ 311,892</u>

The Company completed its annual goodwill impairment assessments as of October 1, 2016 and 2015. (As a result of the 2014 Acquisition, there was no goodwill or indefinite-lived intangible asset impairment test required for 2014.) For the annual assessments, the Company bypassed the option to perform the qualitative assessment and proceeded directly to performing the first step of the two-step goodwill impairment test for each of its reporting units. As a result of the Business Combination, for the October 1, 2016 assessment, the Company identified four reporting units, two in each of its operating segments (PM&C and EC&S). For the October 1, 2015 assessment, the Company identified one reporting unit for testing.

The Company determined the fair value of its reporting units using a split between a market approach and an income, or discounted cash flow, approach. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Estimating the fair value of a reporting unit requires various assumptions including the use of projections of future cash flows and discount rates that reflect the risks associated with achieving those cash flows. The key assumptions used in estimating the fair value were the operating margin growth rates, revenue growth rates from implementation of strategic plans, the weighted average cost of capital, the perpetual growth rate, and the estimated earnings market multiples of each reporting unit. The market value was estimated using publicly traded

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comparable company values by applying their most recent annual EBITDA multiples to the reporting unit's trailing twelve months EBITDA. The income approach value was estimated using a discounted cash flow approach. The assumptions about future cash flows and growth rates are based on management's assessment of a number of factors including the reporting unit's recent performance against budget as well as management's ability to execute on planned future strategic initiatives. Discount rate assumptions are based on an assessment of the risk inherent in those future cash flows.

As of October 1, 2016 and 2015, the fair values of each of the Company's reporting units (with the exception of one) substantially exceeded their respective carrying values and therefore, the second step of the two-step goodwill impairment test was not required. For the Company's performance chemicals reporting unit within its PM&C segment, the result of the annual goodwill impairment test as of October 1, 2016 indicated that the fair value of the reporting unit was in excess of its carrying amount by 10%. Actual sales trends for the reporting unit were lower than originally forecasted due to unfavorable foreign exchange as well as lower volumes in certain product groups, particularly in the base silicate, pulp and paper, and drilling markets. The Company believes the performance chemicals reporting unit remains well positioned over the long term with respect to its entire portfolio of products; however, a deterioration in the macroeconomic environment could adversely affect the fair value or carrying amount of this reporting unit. The amount of goodwill associated with this reporting unit was \$577,667 as of the October 1, 2016 testing date.

In addition to the annual goodwill impairment assessment, the Company also performed the annual impairment test over its other indefinite-lived intangible assets as of October 1, 2016 and 2015. As a result of the test, the Company determined that the trade names related to its performance chemicals reporting unit within the PM&C segment and its catalysts reporting unit within the EC&S segment were impaired as of October 1, 2016. The impaired intangibles related to those identified as part of the Business Combination. The fair value of the respective trade names was determined using the relief-from-royalty method based on the discounted cash flows used in the goodwill impairment test. Slower sales growth rates for both reporting units led to the recognition of the impairment charges. Based on the testing performed, the Company recorded non-cash impairment charges of \$5,350 related to trade names within the performance chemicals reporting unit and \$1,523 related to trade names within the catalysts reporting unit. The impairment charges are included in the other operating expense, net line item of the Company's consolidated statement of operations for the year ended December 31, 2016.

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Gross carrying amounts and accumulated amortization for intangible assets other than goodwill are as follows:

	December 31, 2016					December 31, 2015		
	Gross Amounts	Accumulated Amortization	Impairment Charge	Foreign Exchange Impact	Net Balance	Gross Amounts	Accumulated Amortization	Net Balance
Technical know-how	\$214,290	\$ (10,029)	\$ —	\$ (7,855)	\$ 196,406	\$ 24,990	\$ (1,935)	\$ 23,055
Customer relationships	368,000	(31,199)	—	(11,064)	325,737	99,300	(7,176)	92,124
Contracts	19,800	(3,658)	—	—	16,142	—	—	—
Trademarks	35,400	(1,573)	—	(567)	33,260	—	—	—
Permits	9,100	(3,792)	—	—	5,308	9,271	(1,966)	7,305
Total definite-lived intangible assets	<u>646,590</u>	<u>(50,251)</u>	<u>—</u>	<u>(19,486)</u>	<u>576,853</u>	<u>133,561</u>	<u>(11,077)</u>	<u>122,484</u>
Indefinite-lived trade names	165,900	—	(6,873)	(5,105)	153,922	14,800	—	14,800
Indefinite-lived trademarks	82,900	—	—	(3,902)	78,998	—	—	—
In-process research and development	6,800	—	—	—	6,800	—	—	—
Total intangible assets	<u>\$902,190</u>	<u>\$ (50,251)</u>	<u>\$ (6,873)</u>	<u>\$(28,493)</u>	<u>\$ 816,573</u>	<u>\$ 148,361</u>	<u>\$ (11,077)</u>	<u>\$ 137,284</u>

The Company amortizes technical know-how over periods that range from fourteen to twenty years, customer relationships over periods that range from seven to fifteen years, trademarks over a fifteen year period, contracts over periods that range from two to sixteen years, and permits over five years.

Amortization of intangibles included in cost of goods sold on the consolidated statements of operations was \$13,573 and \$3,605 for the years ended December 31, 2016 and 2015, respectively, and \$300 and \$3,481 for the Successor and Predecessor Periods of 2014, respectively. Amortization of intangibles included in other operating expense, net on the consolidated statements of operations was \$25,263 and \$6,605 for the years ended December 31, 2016 and 2015, respectively, and \$552 and \$5,806 for the Successor and Predecessor Periods of 2014, respectively.

Estimated future aggregate amortization expense of intangible assets is as follows:

Year	Amount
2017	\$ 52,550
2018	50,930
2019	49,961
2020	46,410
2021	45,468
Thereafter	331,534
Total estimated future aggregate amortization expense	<u>\$ 576,853</u>

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14. Accrued Liabilities:

The following table summarizes the components of accrued liabilities as follows:

	December 31,	
	2016	2015
Compensation and bonus	\$47,823	\$11,684
Interest	9,139	2,947
Property tax	2,499	2,106
Environmental reserves (see Note 22)	8,346	1,857
Supply contract obligation (see Note 25)	1,638	1,638
Income taxes	8,035	—
Commissions and rebates	2,253	—
INEOS Group liability (see Note 22)	1,590	—
Supplemental retirement plans	1,170	—
Other	16,940	15,155
Total	<u>\$99,433</u>	<u>\$35,387</u>

15. Long-term Debt:

The summary of long-term debt is as follows:

	December 31,	
	2016	2015
Senior secured USD term loans with interest at 5.25% (due May 2022)	\$ 925,430	\$ —
Senior secured Euro term loans with interest at 5.00% (due May 2022)	297,317	—
Senior secured notes with interest at 6.75% (due November 2022)	625,000	—
Senior unsecured notes with interest at 11.75% (due May 2022)	525,000	—
Senior unsecured notes with interest at 8.50% (due November 2022)	200,000	200,000
Senior secured term loans with interest at 4.75% (was due December 2021)	—	495,000
ABL revolving credit facility (due May 2021)	—	—
Other	45,223	—
Total debt	2,617,970	695,000
Original issue discount	(28,497)	(2,160)
Deferred financing costs	(27,275)	(19,739)
Total debt, net of original issue discount and deferred financing costs	2,562,198	673,101
Less: current portion	(14,481)	(5,000)
Total long-term debt	<u>\$ 2,547,717</u>	<u>\$ 668,101</u>

Concurrent with the closing of the Business Combination, the Company refinanced the existing credit facilities of PQ Holdings and Eco Services by (i) entering into a \$1,200,000 senior secured term loan (consisting of a \$900,000 senior secured term loan and a \$300,000 Euro equivalent senior secured term loan), (ii) issuing \$625,000 in new senior secured notes, (iii) issuing \$525,000 in senior unsecured notes, and (iv) entering into a \$200,000 asset-based secured revolving credit facility. The existing PQ Holdings credit facilities were not legally assumed as part of the Business Combination, and the extinguishment of the debt was included as part of the consideration transferred for the Business Combination (see Note 7 to these consolidated financial statements for further information).

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The Company recorded \$4,747 of new creditor and third-party financing costs as debt extinguishment costs. In addition, previous unamortized deferred financing costs of \$6,252 and original issue discount of \$989 associated with the previously outstanding debt were written off as debt extinguishment costs.

The Company incurred deferred financing fees associated with the financing of its debt. Such deferred financing costs are amortized over the terms of the related agreements. Amortization of deferred costs of \$3,780 and \$2,801 for the years ended December 31, 2016 and 2015, respectively, were included in interest expense. In addition, the Company paid original issue discount associated with the financing of its debt. The original issue discount is amortized over the terms of the related agreements. Amortization of original issue discount of \$3,079 and \$314 for the years ended December 31, 2016 and 2015, respectively, were included in interest expense.

Senior Secured USD and Euro Term Loans and Asset-Based Revolving Loan

Concurrent with the Business Combination, the Company entered into new senior secured credit facilities (collectively, the “New Senior Secured Credit Facilities”) comprised of a \$1,200,000 term loan facility consisting of a \$900,000 U.S. dollar-denominated tranche and a \$300,000 Euro-denominated (or €265,000) tranche (the “Term Loan Facility”), and a \$200,000 asset-based revolving credit facility (the “ABL Facility”). The Term Loan Facility was issued at 99.0% of the principal amount. Borrowings under the Term Loan Facility bore interest at a rate equal to the LIBOR rate (or EURIBOR rate, as applicable) or the base rate elected by the Company at the time of the borrowing plus a margin of 4.75% or 3.75%, respectively. Further, the LIBOR rate and base rate elected under the facilities are subject to a floor of 1.00% and 2.00%, respectively. The Term Loan Facility requires minimum scheduled quarterly principal payments equal to 0.25% of the original principal amount of the term loans made on the closing date of the Business Combination. The Term Loan Facility has a maturity date of November 4, 2022, which date may be accelerated prior to the maturity date of the 2022 Notes unless the 2022 Notes have been refinanced or repaid prior to such time.

On November 14, 2016 (the “First Amendment Closing Date”), the Company entered into the First Amendment Agreement to the Term Loan Facility (the “First Amendment”) pursuant to which the Company, among other things: (a) refinanced the existing \$900,000 U.S. dollar-denominated tranche by issuing a U.S. dollar-denominated replacement term loan in the amount of \$927,750 and (b) refinanced the existing €265,000 (or \$300,000) Euro-denominated tranche by issuing a Euro-denominated replacement term loan in the amount of €283,338. Included in the U.S. dollar-denominated replacement term loan is an additional \$30,000 principal amount of borrowings. Included in the Euro-denominated replacement term loan is an additional €19,000 principal amount of borrowings. The borrowings under the First Amendment bear interest at a rate equal to the LIBOR rate or the base rate elected by the Company at the time of borrowing plus a margin of 4.25% for U.S. dollar-denominated LIBOR Rate loans, 4.00% for Euro-denominated LIBOR Rate loans or 3.25%, for base rate loans. These new replacement term loans have substantially the same terms under the original Term Loan Facility subject to the amendments contained in the First Amendment.

The Company recorded \$474 of new creditor and third-party financing costs as debt extinguishment costs. In addition, previous unamortized deferred financing costs of \$564 and original issue discount of \$756 associated with the previously outstanding debt were written off as debt extinguishment costs.

The Company may at any time or from time to time voluntarily prepay loans under the Term Loan Facility in whole or in part without premium or penalty.

The Term Loan Facility further requires prepayments from certain “net cash proceeds” received and 50% of “excess cash flow” with step downs to lower percentages based on the Company’s leverage ratio, if applicable. In

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accordance with the Term Loan Facility, net cash proceeds generally relate to proceeds received from the issuance or incurrence of certain indebtedness or proceeds received on the disposition of assets, adjusted for certain costs and expenses, and are payable promptly upon receipt, subject in the case of net cash proceeds from asset dispositions or condemnation/casualty events exceeding certain thresholds. Net cash proceeds in respect of asset dispositions are not payable if such proceeds are reinvested in the Company's business within a certain specified time period. Excess cash flow is to be calculated annually and is defined as the sum of consolidated adjusted EBITDA, consolidated working capital adjustments and consolidated net income, each adjusted for various expenditures and/or proceeds commencing with the fiscal year ending on December 31, 2017. Prepayments with respect to excess cash flow, if any, are to be made on an annual basis due within 5 business days after the annual audited financials are delivered to the lenders thereunder of each year. The remaining principal balance of the term loans are due upon maturity.

The loans and guarantees under the Term Loan Facility are secured (i) by a first-priority security interest in, among other things, substantially all of the Company's and the guarantors' equity interests, equipment, intellectual property, pledged debt, material real estate assets, general intangibles, books, records and supporting obligations related to the foregoing and any other assets (other than collateral securing the ABL Facility on a first-priority basis) and (ii) by a second-priority security interest in receivables, inventory, deposit accounts and other collateral securing the ABL Facility. The liens securing the Term Loan Facility and the guarantees are *pari passu* with the liens securing the Senior Secured Notes subject to the *pari passu* intercreditor agreement.

The ABL Facility provides for up to \$200,000 in revolving credit borrowings consisting of up to \$150,000 in U.S. available borrowings, up to \$10,000 in Canadian available borrowings and up to \$40,000 of European available borrowings. Borrowings under the ABL Facility bear interest at a rate equal to the LIBOR rate or the base rate elected by the Company at the time of the borrowing plus a margin of between 1.50%—2.00% or 0.50%—1.00%, respectively, depending on availability under the ABL Facility. In addition, there is an annual commitment fee equal to 0.375%, with a step-down to 0.25% based on the average usage of the revolving credit borrowings available. As of December 31, 2016, there were no revolving credit borrowings under the ABL Facility. Revolving credit borrowings are payable at the option of the Company throughout the term of the ABL Facility with the balance due May 4, 2021.

The Company has the ability to request letters of credit under the ABL Facility. The Company had \$18,417 of letters of credit outstanding as of December 31, 2016, which reduce available borrowings under the ABL Facility by such amounts.

The loans and guarantees under the ABL Facility are secured (i) by a first-priority security interest in, among other things, substantially all of the Company's and the guarantors' receivables, inventory, deposit accounts and other collateral securing the ABL Facility on a first-priority basis and (ii) by a second-priority security interest in the property and assets that secure the Term Loan Facility. In addition, the ABL Facility is secured by the equity interests in, and substantially all of the assets of, certain foreign guarantors in connection with the Canadian dollar-denominated and Euro-denominated availability.

The Term Loan Facility and the ABL Facility contain various non-financial restrictive covenants. Each limits the ability of PQ Corporation and its restricted subsidiaries to incur certain indebtedness or liens, merge, consolidate or liquidate, dispose of certain property, make investments or declare or pay dividends, make optional payments, modify certain debt instruments, enter into certain transactions with affiliates, enter into certain sales and leasebacks, and certain other non-financial restrictive covenants. The ABL Facility also contains one financial covenant which applies when minimum availability under the ABL Facility exceeds a certain threshold. During such time, the Company is required to maintain a fixed-charge coverage ratio of at least 1.0 to 1.0.

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Senior Secured Notes

Concurrent with the Business Combination, the Company issued \$625,000 of 6.750% Senior Secured Notes due November 2022 (the “Senior Secured Notes”) in transactions exempt from or not subject to registration under the Securities Act pursuant to Rule 144A and Regulation S under the Securities Act of 1933. The Senior Secured Notes are senior secured obligations of the Company and rank equally in right of payment with all of the Company’s existing and future senior debt, and are senior in right of payment to all of the Company’s existing and future subordinated debt. The Senior Secured Notes are effectively senior to all of the Company’s existing and future unsecured indebtedness that is not secured, to the extent of the value of the collateral securing the Senior Secured Notes. The Senior Secured Notes are effectively subordinated to the Company’s ABL Facility, to the extent of the value of the assets securing the ABL Facility on a first priority basis. The Senior Secured Notes are also structurally subordinated to the liabilities of PQ Corporation’s existing and future non-guarantor subsidiaries. The indenture relating to the Senior Secured Notes contains various limitations on the Company’s and its restricted subsidiaries’ ability to incur additional indebtedness, pay dividends or repay certain debt, make loans and investments, sell assets, create liens, enter into transactions with affiliates, enter into agreements restricting PQ Corporation’s subsidiaries ability to pay dividends, and merge and consolidate with other companies, among other things. Interest on the Senior Secured Notes is payable on May 15 and November 15 of each year, commencing November 15, 2016. No principal payments are required with respect to the Senior Secured Notes prior to their final maturity. The Senior Secured Notes mature on November 15, 2022.

The obligations of the Company under the Senior Secured Notes and the related indenture are guaranteed by PQ Holdings and CPQ Midco I Corporation, PQ Corporation’s direct parent, and each of PQ Corporation’s current and future domestic subsidiaries that is a guarantor under the Term Loan Facility. The obligations of the Company under the Senior Secured Notes and the indenture are secured (i) by a first-priority security interest in substantially all of the Company’s and the guarantors’ property and assets that secure the Term Loan Facility (other than collateral securing the ABL Facility on a first-priority basis) and (ii) by a second-priority security interest in receivables, inventory, deposit accounts and other collateral securing the ABL Facility. The liens securing the Senior Secured Notes and the guarantees are *pari passu* with the liens securing the Term Loan Facility subject to the *pari passu* intercreditor agreement.

If any Event of Default (other than a default relating to certain events of bankruptcy or insolvency of PQ Corporation or certain of its subsidiaries) occurs and is continuing under the Indenture, the Trustee or the Holders of at least 30% in principal amount of the then total outstanding notes by notice to the Company may declare the principal, premium, if any, interest and any other monetary obligations on all the then outstanding notes to be due and payable immediately. If an event of default arising from certain events of bankruptcy or insolvency of the Company occurs, the principal of, premium, if any, and interest on all the Senior Secured Notes shall become immediately due and payable without any declaration or other act on the part of the trustee or any holders.

Upon the occurrence of a change of control, as defined, each holder will have the right to require the Company to purchase all or any part of such holder’s Senior Secured Notes at a purchase price in cash equal to 101% of the principal amount, plus accrued and unpaid interest.

Senior Unsecured Notes

Concurrent with the Business Combination, the Company issued \$525,000 aggregate principal amount of floating rate Senior Unsecured Notes due 2022 (the “Senior Unsecured Notes”) in a concurrent private placement exempt from the registration requirements of the Securities Act. The notes were issued at 98.0% of the principal amount. The Senior Unsecured Notes will mature on May 1, 2022; provided that if the 2022 Notes have been

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refinanced or otherwise repaid prior to such date, the Senior Unsecured Notes will instead mature on May 1, 2023. Interest on the Senior Unsecured Notes is paid and reset quarterly at an annual rate equal to the three-month LIBOR plus 10.75% per year, with a 1.0% LIBOR floor. The note purchase agreement relating to the Senior Unsecured Notes contains various limitations on the Company's and its restricted subsidiaries' ability to incur additional indebtedness, pay dividends or repay certain debt, make loans and investments, sell assets, create liens, enter into transactions with affiliates, enter into agreements restricting PQ Corporation's subsidiaries ability to pay dividends, and merge and consolidate with other companies, among other things. Interest is payable on March 15, June 15, September 15, and December 15 of each year, commencing on June 15, 2016. The Senior Unsecured Notes are senior unsecured obligations of the Company and the guarantors. The obligations of the Company under the Senior Unsecured Notes and the related note purchase agreement are guaranteed by PQ Holdings and CPQ Midco I Corporation, PQ Corporation's direct parent, and each of PQ Corporation's subsidiaries that is a guarantor under the New Senior Secured Credit Facilities.

If any event of default (other than a default relating to certain events of bankruptcy or insolvency of PQ Corporation or certain of its subsidiaries) shall occur and be continuing, holders then holding greater than 50% of the sum of the aggregate principal amount of Senior Unsecured Notes then outstanding may, through the agent named in the note purchase agreement, declare the principal of, premium, if any, and accrued but unpaid interest on all the Senior Unsecured Notes to be due and payable and the same shall become immediately due and payable. If an event of default arising from certain events of bankruptcy or insolvency of the Company occurs, the principal of, premium, if any, and interest on all the Senior Unsecured Notes shall become immediately due and payable without any declaration or other act on the part of the agent or any holders.

Within ten days after the Company has knowledge of the occurrence of a change of control, as defined, the Company will give notice of the change of control to the agent and shall offer to prepay all, but not less than all, of the Senior Unsecured Notes held by each holder. In the event that the change of control occurs prior to the second anniversary of the closing date of the Senior Unsecured Notes, the notes will be prepaid at a price equal to 100% of the principal amount so prepaid, plus a make-whole premium. In the event that the change of control occurs on or after the second anniversary but before the third anniversary of the closing date, the Senior Unsecured Notes will be prepaid at a price equal to 106% of the principal amount so prepaid, plus accrued and unpaid interest thereon as of the date of prepayment. In the event that the change of control occurs on or after the third anniversary but before the fourth anniversary of the closing date, the Senior Unsecured Notes will be prepaid at a price equal to 103% of the principal amount so prepaid, plus accrued and unpaid interest thereon as of the date of prepayment. In the event that the change of control occurs on or after the fourth anniversary but before the fifth anniversary of the closing date, the Senior Unsecured Notes will be prepaid at a price equal to 101% of the principal amount so prepaid, plus accrued and unpaid interest thereon as of the date of prepayment. In the event that the change of control occurs on or after the sixth anniversary of the closing date, the Senior Unsecured Notes will be prepaid at a price equal to 100% of the principal amount so prepaid, plus accrued and unpaid interest thereon as of the date of prepayment.

Senior Secured Credit Facilities

On December 1, 2014, Eco Services entered into a credit agreement (the "Senior Credit Agreement") governing a \$555,000 senior secured credit facility, which included a \$500,000 term loan facility and a \$55,000 revolving credit facility (collectively, the "Senior Secured Credit Facilities"). The full amount of the \$500,000 term loan facility was drawn on December 1, 2014 (the "Eco Credit Facility Closing Date") to finance a portion of 2014 Acquisition with Solvay, including working capital and/or purchase price adjustments payable on the Eco Credit Facility Closing Date and the payment of related fees, expenses and other costs of the transactions. The Senior Credit Agreement was due to mature on December 1, 2021.

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Borrowings under the Senior Credit Agreement bore interest at a rate per annum equal to an applicable interest rate margin, plus, at Eco Services' option, either (a) a base rate determined by the reference to the highest of (1) the prime commercial lending rate publicly announced by the administrative agent as the "prime rate" as in effect on such day, (2) the federal funds effective rate plus 0.50%, and (3) the LIBOR rate determined by reference to the cost of funds for Eurodollar deposits for an interest period of one month, plus 1.00% or (b) a LIBOR rate determined by reference to the costs of funds for Eurodollar deposits for the specified interest period, as adjusted for certain statutory reserve requirements. As of December 31, 2015, the interest rate on the Senior Credit Agreement was 4.75%.

The term loan facility was issued at 99.5% of the principal amount, resulting in an original issue discount on the term loan facility of \$2,500. The accretion of the original issue discount is reported as interest expense, and is accreted under the effective interest method over the term of the loan.

Proceeds from the revolving credit facility were to be used to finance the Company's working capital needs and other general corporate purposes, including investments, restricted payments and any other purpose not prohibited as defined in the Senior Credit Agreement. In 2015, the Company borrowed and repaid \$12,000 under the revolving credit facility, resulting in no outstanding credit balance on the revolving credit facility as of December 31, 2015. The unamortized debt issuance costs of \$1,585 as of December 31, 2015 related to the revolving credit facility are presented as a noncurrent asset.

A portion of the revolving credit facility, not to exceed \$25,000, was also available for the issuance of letters of credit. As of December 31, 2015, Eco Services issued letters of credit totaling \$13,270.

Concurrent with the Business Combination, on May 4, 2016 the Senior Secured Credit Facilities were refinanced and as such, there is no principal amount outstanding as of December 31, 2016.

2022 Notes

In December 2014, Eco Services issued \$200,000 aggregate principal amount of 8.50% senior notes due 2022 (the "2022 Notes") under an indenture dated October 24, 2014. The 2022 Notes were issued in a private transaction exempt from the registration requirements of the Securities Act. Pursuant to the indenture governing the 2022 Notes, PQ Group Holdings assumed the obligations of Eco Services under the 2022 Notes following the Business Combination. Interest on the 2022 Notes is payable on May 1 and November 1 of each year. The 2022 Notes mature on November 1, 2022 and were issued at 100% of the principal amount. In 2014, the Successor Company recorded \$3,000 of costs related to potential bridge financing that was charged to interest expense upon the issuance of the 2022 Notes. The 2022 Notes are unsecured senior obligations of the Company, *pari passu* in right of payment to all existing and future senior indebtedness of the Company, and effectively subordinated to all secured indebtedness of the Company to the extent of the value of the assets securing such senior indebtedness. The 2022 Notes are senior in right of payment to all subordinated indebtedness of the Company.

The Company is not required to make any mandatory redemption or sinking fund payments with respect to the 2022 Notes. However, under certain circumstances, the Company may be required to offer to purchase the 2022 Notes if it undergoes a change in control or a sale of assets.

At any time prior to November 1, 2017, the Company may redeem all or part of the 2022 Notes, at its option, at a redemption price equal to 100% of the principal amount redeemed plus an applicable make-whole premium and accrued and unpaid interest.

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On and after November 1, 2017, the Company may redeem all or part of the 2022 Notes, at its option, at the redemption prices (expressed as percentages of the principal amount of the 2022 Notes redeemed) set forth below, plus accrued and unpaid interest, beginning on November 1 of each of the years indicated below:

Year	Percentage
2017	104.25%
2018	102.13%
2019 and thereafter	100.00%

In addition, until November 1, 2017, the Company may, at its option, on one or more occasions redeem up to 40% of the aggregate principal amount of the 2022 Notes at a redemption price equal to 108.50% of the aggregate principal amount thereof, plus accrued and unpaid interest, with the net cash proceeds of certain equity offerings, provided that at least 50% of the aggregate principal amount of the 2022 Notes originally issued remains outstanding immediately after the occurrence of each such redemption.

New Markets Tax Credit Financings

On October 24, 2013, PQ Holdings' (and now the Company's) subsidiary Potters Industries, LLC ("Potters") entered into a NMTC financing arrangement with JPMorgan Chase Bank N.A. and several of its affiliates ("Chase") and TX CDE V LLC, an affiliate of Texas LIC Development Company LLC d/b/a Texas Community Development Capital ("TX CDE") to fund the expansion of Potters' manufacturing facility in Paris, Texas (the "2013 NMTC Agreement"). The NMTC program, which is administered by the United States Treasury Department, requires certain balance sheet commitments. The 2013 NMTC Agreement will provide the Company with certain monetary benefits as an offset to specifically identified capital expenditures. The 2013 NMTC Agreement requires that certain commitments and covenants be maintained over a period of seven years in order to legally recognize the benefit. Chase agreed to contribute \$6,634 and an additional \$15,632 in funds lent to Chase by Potters Holdings II, L.P. to TX CDE. TX CDE, in turn, lent \$21,000 in the form of \$5,368 and \$15,632 of notes to Potters, which used the proceeds to finance the expansion of Potters' manufacturing facility in Paris, Texas. The capital expenditures associated with the 2013 NMTC Agreement were completed in 2014. The \$21,000 of debt related to the 2013 NMTC was assumed as part of the Business Combination and was outstanding as of December 31, 2016.

In connection with the 2013 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 September 6, 2020. The maximum potential amount of future payments under this indemnification is approximately \$12,600. The Company currently believes that the likelihood of a required payment under this indemnification is remote.

On May 17, 2016, Potters entered into a NMTC financing arrangement with U.S. Bank N.A. and several of its affiliates ("USB") and MRC XX LLC, an affiliate of Midwest Renewable Capital, LLC ("MRC"), to fund the expansion of Potters' manufacturing facility in Augusta, Georgia (the "May 2016 NMTC Agreement"). The May 2016 NMTC Agreement provides the Company with certain monetary benefits as an offset to specifically identified capital expenditures. The May 2016 NMTC Agreement requires that certain commitments and covenants be maintained over a period of seven years in order to legally recognize the benefit. USB agreed to

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contribute \$3,732 and an additional \$7,822 in funds lent to USB by Potters Holdings II, L.P. to MRC. MRC, in turn, lent \$11,000 in the form of \$7,822, \$1,311 and \$1,866 of notes to Potters, which used the proceeds to finance the expansion of Potters' manufacturing facility in Augusta, Georgia. The \$11,000 was outstanding as of December 31, 2016. The capital expenditures associated with the May 2016 NMTC Agreement are expected to be completed in 2017.

In connection with the May 2016 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 May 17, 2023. The maximum potential amount of future payments under this indemnification is approximately \$4,077. The Company currently believes that the likelihood of a required payment under this indemnification is remote.

On December 29, 2016, Potters entered into a second NMTC financing arrangement with USB and MRC whereby USB agreed to contribute \$3,815 and an additional \$7,775 in funds lent to USB by Potters Holdings II, L.P. to MRC. MRC, in turn, lent \$11,000 in the form of \$7,775, \$1,402 and \$1,823 of notes to Potters, which will use the proceeds as working capital for another expansion of Potters' manufacturing facility in Paris, Texas (the "December 2016 NMTC Agreement"). The \$11,000 was outstanding as of December 31, 2016. Potters expects to expend the proceeds of the notes as working capital in 2017.

In connection with the December 2016 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 December 29, 2023. The maximum potential amount of future payments under this indemnification is approximately \$4,290. The Company currently believes that the likelihood of a required payment under this indemnification is remote.

Other Debt

The Company also has several note payable agreements denominated in Japanese Yen which enables the Company to borrow up to a total of 260,000 Japanese Yen, or \$2,158. Borrowings bear interest at either TIBOR ("Tokyo Interbank Offered Rate") plus a margin or the short-term prime rate with a weighted average rate of 0.53% as of December 31, 2016. The terms of the agreements vary and are renewable upon expiration of the term with the balances due in 2016. Borrowings under the agreement are payable at the option of the Company throughout the term of the agreements. Borrowings outstanding under these agreements were \$2,158 as of December 31, 2016.

Certain of the Company's foreign subsidiaries maintain other note payable agreements. These agreements are not further described as they are not significant to the consolidated financial statements.

The fair value of a financial instrument is the amount at which the instrument could be exchanged in a current transaction. As of December 31, 2016 and 2015, the fair value of the senior secured term loans and senior secured and unsecured notes was higher than book value by \$68,477 and lower than book value by \$42,375, respectively. The fair value of the senior secured term loans and senior secured and unsecured notes was derived from published loan prices at December 31, 2016 and 2015, as applicable. The fair value is classified as Level 2 based upon the fair value hierarchy (see Note 4 to these consolidated financial statements for further information on fair value measurements).

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The aggregate long-term debt maturities are:

Year	Amount
2017	\$ 14,481
2018	12,258
2019	12,258
2020	12,258
2021	33,258
Thereafter	2,533,457
	<u>\$ 2,617,970</u>

16. Other Long-term Liabilities:

The following table summarizes the components of other long-term liabilities as follows:

	December 31,	
	2016	2015
Pension benefits	\$ 71,443	\$ 20,239
Supply contract (see Note 25)	22,250	23,888
Other postretirement benefits	3,991	—
Supplemental retirement plans	12,055	—
Reserve for uncertain tax positions	4,149	—
Asset retirement obligation	3,700	—
INEOS Group liability (see Note 22)	329	—
Other	5,238	3,850
Total	<u>\$ 123,155</u>	<u>\$ 47,977</u>

17. 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.

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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.

Use of Derivative Financial Instruments to Manage Interest Rate Risk. The Company is exposed to fluctuations in interest rates on the New 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 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 December 31, 2016 are shown below:

	<u>Balance sheet location</u>	<u>December 31, 2016</u>
Asset derivatives:		
Derivatives designated as cash flow hedges:		
Natural gas swaps	Current assets	\$ 573
Natural gas swaps	Other long-term assets	58
Interest rate caps	Other long-term assets	<u>5,803</u>
Total asset derivatives		<u>\$ 6,434</u>

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The following table shows the effect of the Company's derivative instruments designated as hedges on other comprehensive income (loss) ("OCI") and the statement of income for the year ended December 31, 2016:

	<u>Location in Earnings</u>	<u>Year ended December 31, 2016</u>
Derivatives designated as cash flow hedges:		
AOCI derivative gain (loss) at beginning of year		\$ —
Effective portion of changes in fair value recognized in OCI:		
Interest rate caps		4,250
Natural gas swaps		(802)
Amount of gain reclassified from OCI to earnings:		
Interest rate caps	Interest expense	—
Natural gas swaps	Cost of goods sold	1,433
AOCI derivative gain at end of year		<u>\$ 4,881</u>

Amounts of unrealized gains in OCI that are expected to be reclassified to the consolidated statement of operations over the next twelve months are \$533 as of December 31, 2016.

18. Income Taxes:

Years Ended December 31, 2016 and 2015, and the Period from Inception (July 30, 2014) to December 31, 2014 (Successor Period)

Income (loss) before income taxes and non-controlling interest within or outside the United States are shown below:

	<u>Years ended December 31,</u>		<u>Successor Period from inception (July 30, 2014) to December 31, 2014</u>
	<u>2016</u>	<u>2015</u>	<u>2014</u>
Domestic	\$(84,094)	\$11,427	\$ (22,061)
Foreign	14,977	—	—
Total	<u>\$(69,117)</u>	<u>\$11,427</u>	<u>\$ (22,061)</u>

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The provision (benefit) for income taxes as shown in the accompanying consolidated statements of operations consists of the following:

	<u>December 31,</u> <u>2016</u>
Current:	
Federal	\$ (434)
State	91
Foreign	10,088
	<u>9,745</u>
Deferred:	
Federal	9,088
State	292
Foreign	(9,084)
	<u>296</u>
Provision for income taxes	<u>\$ 10,041</u>

A reconciliation of income tax expense (benefit) at the U.S. federal statutory income tax rate of 35% to actual income tax expense is as follows:

	<u>December 31,</u> <u>2016</u>
Tax at statutory rate	\$ (24,191)
State income taxes, net of federal income tax benefit	(4,110)
Goodwill Impairment	—
Repatriation of non-US earnings	4,576
Change in Tax Status—Eco—Passthrough to C-Corp	33,891
Changes in uncertain tax positions	(2,383)
Change in valuation allowances	2,577
Deduction on foreign taxes	—
Change in state effective rates	(290)
Foreign withholding taxes	1,505
Foreign tax rate differential	(1,354)
Provision to return adjustments	—
Non-deductible transaction costs	667
Other, net	(847)
Provision for income taxes	<u>\$ 10,041</u>

The total tax provision of \$10,041 for the year ended December 31, 2016 on the Company's consolidated pre-tax income for the period differs from the U.S. statutory tax rate of 35% principally due to the repatriation of non-U.S. earnings, foreign income tax in jurisdictions with statutory rates different than the U.S. rate, state taxes, non-deductible transaction costs, foreign withholding taxes, changes in valuation allowance, and changes in uncertain tax positions.

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

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and/or benefits of Eco Services were passed through to their members. Because Eco Services was taxed as a partnership, it did not record deferred taxes on the basis difference on their 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 tax rates. As Eco Services had not previously recorded deferred taxes on the basis difference, the Company recognized net deferred tax liabilities of \$33,891 for the year ended December 31, 2016 primarily related to basis differences in depreciable fixed assets and intangible assets based upon prevailing corporate tax rates.

Deferred tax assets (liabilities) are comprised of the following:

	<u>December 31,</u> <u>2016</u>
Deferred tax assets:	
Net operating loss carryforwards	\$ 157,811
Pension	21,454
Postretirement health	1,040
Transaction costs	2,896
Natural gas contracts	—
Interest rate swaps	—
Unrealized translation losses	6,046
Other	44,351
Valuation allowance	(38,271)
	<u>\$ 195,327</u>
Deferred tax liabilities:	
Depreciation	\$ (114,749)
Undistributed earnings of non-US subsidiaries	(73,205)
LIFO reserve	—
Inventory	(20,159)
Intangible assets	(276,671)
Natural gas contracts	(241)
Other accruals	(1,621)
Other	(27,144)
	<u>\$ (513,790)</u>
Net deferred tax liabilities	<u>\$ (318,463)</u>

Included in the 2016 deferred tax asset and liability amounts for depreciation, intangible assets, inventory, natural gas contracts, and other above is (\$75,539) of a net deferred tax liability related to the Company's investment in Potters, which is a partnership for federal income tax purposes. The Company and one of its subsidiaries own in aggregate 100% of Potters and the assets and liabilities of Potters are included in the consolidated financial statements of the Company.

The \$318,463 in net deferred tax liabilities as of December 31, 2016 consists of \$195,327 in non-current deferred tax assets and \$513,790 in net non-current deferred tax liabilities. Prior to the Business Combination, Eco Services was a single member LLC, treated as a partnership for federal and state tax purposes, with no deferred taxes provided.

The change in net deferred tax assets (liabilities) for the year ended December 31, 2016 was primarily related to the increase in deferred tax assets on accrued pension obligations, and book amortization of intangibles with no corresponding tax basis.

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Following are changes in the deferred tax valuation allowance during the year ended December 31, 2016:

	<u>Beginning Balance</u>	<u>Additions</u>	<u>Reductions</u>	<u>Ending Balance</u>
Year ended December 31, 2016	\$ —	46,347	(8,076)	\$38,271

The net change in the total valuation allowance was an increase of \$38,271 in 2016. Prior to the Business Combination, Eco Services was a single member LLC, treated as a partnership for federal and state tax purposes. Any income tax liabilities and/or benefits of Eco Services were passed through to the member. As such, prior to May 4, 2016, the date of the Business Combination, the valuation allowance was \$0. The valuation allowance at December 31, 2016 was primarily related to foreign and state net operating loss carryforwards and tax credits that, in the judgment of management, are not more likely than not to be realized. In assessing the ability to realize deferred tax assets, management considered whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. Management considered the scheduled reversal of deferred tax liabilities (including the impact of available carryback and carryforward periods), projected future taxable income, and tax-planning strategies that are prudent in making this assessment. In order to fully realize deferred tax assets, the Company will need to generate future taxable income prior to the expiration of the net operating loss and credit carryforwards. The amount of the deferred tax assets considered realizable, however, could be reduced in the near term if estimates of future taxable income during the carryforward period are reduced.

Management considered certain earnings in non-U.S. subsidiaries to be available for repatriation in the future. The tax cost associated with non-U.S. subsidiary earnings and distributions for the year ended December 31, 2016 has been recorded as tax expense for the period. In this regard the Company expects to deduct, rather than credit, foreign tax expense in computing the U.S. tax effects of repatriation from non-U.S. subsidiaries in 2016. The unremitted earnings of non-U.S. subsidiaries and affiliates that have not been reinvested abroad indefinitely amount to \$190,586 as of December 31, 2016. The deferred U.S. federal and state income tax liability and deferred foreign withholding tax liability on these undistributed earnings is estimated to be \$73,205.

As of December 31, 2016, the cumulative unremitted earnings of foreign subsidiaries outside the United States, considered permanently reinvested, for which no income or withholding taxes have been provided, approximated \$194,444. Such earnings are expected to be reinvested indefinitely and, as a result, no deferred tax liability has been recognized with regard to such earnings. Determination of the deferred income tax liability on these unremitted earnings is not practicable, principally because such liability, if any, is dependent on circumstances existing if and when remittance occurs.

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The following table summarizes the activity related to our gross unrecognized tax benefits:

	<u>December 31,</u> <u>2016</u>
Balance at beginning of period	\$ —
Increases related to prior year tax positions	19,419
Decreases related to prior year tax positions	(68)
Increases related to current year tax positions	691
Decreases related to current year tax positions	—
Decreases related to settlements with taxing authorities	(3,914)
Decreases related to lapsing of statute of limitations	—
Balance at end of period	<u>\$ 16,128</u>

Included in the balance of total unrecognized tax benefits are potential benefits of \$16,128 arising from legacy PQ Corporation, that if recognized, would affect the effective tax rate on income from continuing operations as of December 31, 2016.

Interest and penalties recognized related to uncertain tax positions amounted to (\$2,054) in 2016. To the extent interest and penalties are not assessed with respect to uncertain tax positions, amounts accrued will be reduced and reflected as a reduction of the overall income tax provision in the period for which the event occurs requiring the adjustment. The \$1,177 in accrued interest and penalties as of December 31, 2016 is recorded in other long-term liabilities in the consolidated balance sheet.

Due to the Business Combination, the Company files numerous consolidated and separate income tax returns in the U.S. federal jurisdiction and in many state and foreign jurisdictions. The following describes the open tax years, by major tax jurisdiction, as of December 31, 2016:

<u>Jurisdiction</u>	<u>Period</u>
United States—Federal	2007—Present
United States—State	2008—Present
Canada ^(a)	2008—Present
Germany	2012—Present
Netherlands	2011—Present
Mexico	2011—Present
United Kingdom	2012—Present
Brazil	2012—Present

^(a)—Includes federal as well as local jurisdictions

Given that certain U.S. companies have net operating loss carryforwards, the statute for examination by taxing authorities in the United States, and certain state jurisdictions, will remain open for a period following the use of such net operating loss carryforwards, extending the period for examination beyond the years indicated above.

The Company has subsidiaries in various states, provinces and countries that are currently under audit for years ranging from 2008 through 2016. To date, no material adjustments have been proposed as a result of these audits. As of December 31, 2016, the Company does not believe that there are any positions for which it is reasonably possible that the total amount of unrecognized tax benefits will significantly increase or decrease within the next 12 months.

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The Company has a net operating loss carry-forward (“NOL”) available of \$383,182 to reduce future federal taxes payable. The federal carry-forward period is 20 years. As a result of the Business Combination, \$332,376 of the \$383,182 may be subject to the limitations of Section 382 of the Internal Revenue Code (“IRC”). Although potentially subject to the limitations of IRC §382, management believes it is more likely than not that the Company will realize the entire \$332,376 in pre-transaction NOLs in future years. The remaining \$50,806 relates to periods after the Business Combination and would not be subject to IRC §382.

For state income tax purposes, the Company incurred net operating losses of \$92,498 for 2016 that may be carried forward at periods ranging from 5 to 20 years among the states in which the Company is subject to tax to reduce future state income taxes payable. Cumulative state net operating losses carrying forward into 2017 are \$547,641. A valuation allowance of \$10,209 has been applied against the total \$21,659 of state net operating loss deferred tax assets, leaving losses of \$11,450 that have been recognized for financial accounting purposes for the portion of those losses that the Company believes, on a more likely than not basis, will be realized.

Foreign net operating losses of \$59,426, of which \$10,667 will begin to expire in 2037 with the remaining \$48,749 carrying forward indefinitely, are available to reduce future foreign income taxes payable. A valuation allowance of \$11,501 has been applied to \$14,840 of deferred tax assets related to foreign net operating loss carry-forwards, leaving a net deferred tax asset relating to foreign net operating losses of \$3,339 that has been recognized for financial accounting purposes.

Cash payments for income taxes are as follows:

	<u>December 31,</u>		<u>Successor</u>
	<u>2016</u>	<u>2015</u>	<u>period from inception</u>
			<u>(July 30, 2014) to</u>
			<u>December 31,</u>
			<u>2014</u>
Domestic	\$ 373	\$ 8	\$ —
Foreign	<u>16,608</u>	<u>—</u>	<u>—</u>
	<u>\$16,981</u>	<u>\$ 8</u>	<u>\$ —</u>

Predecessor Period

For the Predecessor Period, income taxes have been prepared on a separate return basis as if Solvay’s Eco business unit was a stand-alone entity. Historically, Solvay’s Eco business unit was included in the tax filings with other Solvay entities. Tax expenses (benefits) as presented are not reflective of the results that Solvay’s Eco business unit will generate in the future or would have generated on a stand-alone basis.

Pre-tax income for Solvay’s Eco business unit was as follows:

	<u>January 1 to</u>
	<u>November 30,</u>
	<u>2014</u>
U.S.	\$ 45,147
Total	<u>\$ 45,147</u>

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The components of the provision for income taxes were:

	January 1 to November 30, 2014
Current tax expense:	
U.S. federal	\$ 22,215
U.S. state and local	2,651
Total current tax expense	<u>24,866</u>
Deferred tax (benefit):	
U.S. federal	(9,065)
U.S. state and local	(1,199)
Total deferred tax benefit	<u>(10,264)</u>
Total provision for income taxes	<u><u>\$ 14,602</u></u>

An analysis of the effective income tax rate follows:

	January 1 to November 30, 2014	
Statutory U.S. federal income tax rate	\$ 15,801	35.00%
Meals & entertainment (50%)	55	0.12%
Domestic production deduction	(2,197)	(4.81)%
State taxes—current	1,723	3.77%
State taxes—deferred	(780)	(1.68)%
Provision for income taxes	<u>\$ 14,602</u>	<u>32.40%</u>

19. Benefit Plans:

The Company sponsors defined benefit pension plans covering employees in the United States and certain employees at its foreign subsidiaries. Benefits for a majority of the plans are based on average final pay and years of service. The Company's funding policy is to fund the minimum required contribution under local statutory requirements.

The Company sponsors unfunded plans to provide certain health care benefits to retired employees in the United States and Canada. The plans pay a stated percentage of medical expenses reduced by deductibles and other coverage. The plans are unfunded and obligations are paid out of the Company's operations.

The Company also has defined benefit supplementary retirement plans which provide benefits for certain U.S. employees in excess of qualified plan limitations. The obligations are paid out of the Company's general assets, including assets held in a Rabbi trust, or restoration plan assets.

The Company uses a December 31 measurement date for all of its defined benefit pension, postretirement medical and supplementary retirement plans.

The following discussion includes information for the Eco Services benefit plans for all periods presented, and the acquired PQ Holdings benefit plans beginning on the date of the Business Combination. The Company assumed the liabilities related to those employees participating in the Eco Services benefit plans that were previously sponsored by Solvay upon the date of the 2014 Acquisition. Thus, activity for 2014 reflects the period from December 1, 2014 to December 31, 2014 for the Eco Services benefit plans.

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The Eco Services benefit plans include two defined benefit pension plans and one retiree health plan, all based in the U.S. The PQ Holdings benefit plans include a U.S. defined benefit pension plan as well as the defined benefit pension plans for all of the Company's foreign subsidiaries, two retiree health plans (one each in the U.S and Canada), and the Company's defined benefit supplementary retirement plans.

Of the Company's three defined benefit pension plans covering employees in the U.S., only the Eco Services Hourly Pension Plan continues to accrue benefits subsequent to December 31, 2016. All future accruals were frozen for the PQ Corporation Retirement Plan as of December 31, 2006 and for the Eco Services Pension Equity Plan as of December 31, 2016. With respect to the Company's three retiree health plans, the PQ Holdings plans in the U.S. and Canada were closed to new retirees as of December 31, 2006. The Eco Services Postretirement Life and Dental Plan will be closed to new retirees effective July 1, 2017. The Company's defined benefit supplementary retirement plans were frozen to future accruals as of December 31, 2006.

Defined Benefit Pension Plans

The following tables summarize changes in the benefit obligation, plan assets and funded status of the Company's significant defined benefit pension plans as well as the components of net periodic benefit cost, including key assumptions:

	U.S.		Foreign	
	December 31,		December 31,	
	2016	2015	2016	2015
Change in benefit obligation:				
Benefit obligation at beginning of period	\$ 71,605	\$ 74,048	\$ —	\$ —
Service cost	2,130	2,778	2,106	—
Interest cost	7,680	2,913	2,224	—
Participant contributions	—	—	300	—
Plan curtailments	(1,325)	—	(1,204)	—
Plan settlements	(4,772)	(5,099)	—	—
Benefits paid	(5,390)	(108)	(1,305)	—
Expenses paid	—	—	(66)	—
Net transfer in ⁽¹⁾	192,120	—	99,025	—
Actuarial (gains) losses	(14,630)	(2,927)	9,804	—
Translation adjustment	—	—	(4,859)	—
Benefit obligation at end of the period	<u>\$ 247,418</u>	<u>\$ 71,605</u>	<u>\$ 106,025</u>	<u>\$ —</u>
Change in plan assets:				
Fair value of plan assets at beginning of period	\$ 52,678	\$ 42,469	\$ —	\$ —
Actual return on plan assets	6,897	479	8,274	—
Employers contributions	1,425	14,937	921	—
Employee contributions	—	—	300	—
Plan settlements	(4,772)	(5,099)	—	—
Benefits paid	(5,390)	(108)	(1,305)	—
Expenses paid	—	—	(66)	—
Acquisitions ⁽¹⁾	148,077	—	81,974	—
Translation adjustment	—	—	(3,953)	—
Fair value of plan assets at end of the period	<u>\$ 198,915</u>	<u>\$ 52,678</u>	<u>\$ 86,145</u>	<u>\$ —</u>
Funded status of the plans (underfunded)	<u>\$ (48,503)</u>	<u>\$ (18,927)</u>	<u>\$ (19,880)</u>	<u>\$ —</u>

(1) Relates to the PQ Holdings defined benefit pension plans assumed as part of the Business Combination.

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Amounts recognized in the consolidated balance sheets consist of:

	U.S.		Foreign	
	December 31,		December 31,	
	2016	2015	2016	2015
Noncurrent asset	\$ —	\$ —	\$ 3,391	\$ —
Current liability	—	—	(331)	—
Noncurrent liability	(48,503)	(18,927)	(22,940)	—
Accumulated other comprehensive income (loss)	8,190	520	(2,085)	—
Net amount recognized	<u>\$(40,313)</u>	<u>\$(18,407)</u>	<u>\$(21,965)</u>	<u>\$—</u>

Amounts recognized in accumulated other comprehensive income (loss) consist of:

	U.S.		Foreign	
	December 31,		December 31,	
	2016	2015	2016	2015
Prior service credit	\$ —	\$ —	\$ —	\$ —
Net gain (loss)	12,920	520	(2,686)	—
Gross amount recognized	12,920	520	(2,686)	—
Deferred income taxes	(4,730)	—	601	—
Net amount recognized	<u>\$ 8,190</u>	<u>\$520</u>	<u>\$(2,085)</u>	<u>\$—</u>

Components of net periodic benefit cost consist of:

	U.S.			Foreign		
	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31, 2014	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31, 2014
	2016	2015		2016	2015	
Service cost	\$ 2,130	\$ 2,778	\$ 224	\$ 2,106	\$ —	\$ —
Interest cost	7,680	2,913	246	2,224	—	—
Expected return on plan assets	(9,293)	(2,885)	—	(2,038)	—	—
Amortization of net (gain) loss	—	—	—	(10)	—	—
Curtailed gain recognized	(1,311)	—	—	(517)	—	—
Settlement (gain) loss recognized	152	(2)	—	—	—	—
Net periodic expense (benefit)	<u>\$(642)</u>	<u>\$ 2,804</u>	<u>\$ 470</u>	<u>\$ 1,765</u>	<u>\$—</u>	<u>\$—</u>

There are no estimated net actuarial losses (gains) or prior service costs (credits) for the Company's defined benefit pension plans that will be amortized from accumulated other comprehensive income into net periodic benefit cost in 2017.

The total accumulated benefit obligation as of December 31, 2016 and 2015 for the Company's U.S. pension plans was \$244,003 and \$66,706, respectively. The total accumulated benefit obligation as of December 31, 2016 for the Company's foreign pension plans was \$100,473.

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The following table presents selected information about the Company's pension plans with accumulated benefit obligations in excess of plan assets:

	U.S.		Foreign	
	December 31,		December 31,	
	2016	2015	2016	2015
Projected benefit obligation	\$ 247,418	\$ 71,605	\$ 58,837	\$ —
Accumulated benefit obligation	244,003	66,706	55,981	—
Fair value of plan assets	198,915	52,678	36,771	—

Significant weighted average assumptions used in determining the pension obligations include the following:

	U.S.		Foreign	
	December 31,		December 31,	
	2016	2015	2016	2015
Discount rate	4.24%	4.51%	2.99%	—
Rate of compensation increase ⁽²⁾	3.00%	Age-based / 3.00%	2.97%	—

- (2) With respect to the U.S. plans, the weighted average rate of compensation increase as of December 31, 2016 reflects only the Eco Services Hourly Pension Plan assumption of 3.00%, as both the Eco Services Pension Equity Plan and the PQ Corporation Retirement Plan were frozen to new accruals as of December 31, 2016 (and were included in the average at zero). The weighted average rate of compensation increase at December 31, 2015 for the U.S. plans includes 3.00% for the Eco Services Hourly Pension Plan and an age-based assumption for the Eco Services Pension Equity Plan.

Significant weighted average assumptions used in determining net periodic benefit cost include the following:

	U.S.			Foreign		
	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31,	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31,
	2016	2015	2014	2016	2015	2014
Discount rate	4.02%	4.09%	4.09%	5.16%	—	—
Rate of compensation increase ⁽³⁾	3.10%	Age-based / 3.00%	Age-based / 3.00%	3.95%	—	—
Expected return on assets	6.34%	None assumed	None assumed	5.62%	—	—

- (3) The weighted average rate of compensation increase for the year ended December 31, 2015 and for the period December 1 to December 31, 2014 for the U.S. plans was 3.00% for the Eco Services Hourly Pension Plan and an age-based assumption for the Eco Services Pension Equity Plan.

The discount rate for each of the U.S. plans was determined by utilizing a yield curve model. The model develops a spot rate curve based on the yields available from a broad-based universe of high quality corporate bonds. The discount rate is then set as the weighted average spot rate, using the respective plan's expected benefit cash flows as the weights.

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In determining the expected return on U.S. plan assets, the Company considers the relative weighting of plan assets, the historical performance of total plan assets and individual asset classes, and expected future performance. In addition, the Company may consult with and consider the opinions of our external advisors in developing appropriate return benchmarks.

The investment objective for the U.S. plans is to generate returns sufficient to meet future obligations. The strategy to meet the objective includes generating attractive returns using higher returning assets such as equity securities and balancing risk using less volatile assets such as fixed income securities. The U.S. plans invest in an allocation of assets across the two broadly-defined financial asset categories of equity and fixed income securities. The target allocations for the plan assets across the three U.S. plans are as follows: 45% equity securities and 55% fixed income investments for the PQ Corporation Retirement Plan; 50% equity securities and 50% fixed income investments for the Eco Services Pension Equity Plan; and 48% equity securities and 52% fixed income investments for the Eco Services Hourly Pension Plan.

Similar considerations are applied to the investment objectives of the non-U.S. plans as well as the asset classes available in each location and any legal restrictions on plan investments.

The Company classified plan assets based upon a fair value hierarchy (see Note 4 to these consolidated financial statements for further information). The classification of each asset within the hierarchy is based on the lowest level input that is significant to its measurement. The fair value hierarchy consists of three levels 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 1 assets primarily include investments in publicly traded equity securities and mutual funds. These securities (or the underlying investments of the funds) are actively traded and valued using quoted prices for identical securities from the market exchanges.
- 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 2 assets primarily consist of fixed-income securities and comingled funds that are not actively traded or whose underlying investments are valued using observable marketplace inputs. The fair value of plan assets invested in fixed-income securities is generally determined using valuation models that use observable inputs such as interest rates, bond yields, low-volume market quotes and quoted prices for similar assets. Plan assets that are invested in comingled funds are valued using a unit price or net asset value (“NAV”) that is based on the underlying investments of the fund.
- 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. Level 3 assets include investments covered by insurance policies and real estate funds valued using significant un-observable inputs.

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	Fair value measurements at December 31, 2016			
	Total	Level 1	Level 2	Level 3
Cash and cash equivalents	\$ 1,979	\$ 1,863	\$ 116	\$ —
Equity securities:				
U.S. investment funds	60,179	41,529	18,650	—
International investment funds	58,457	26,119	32,338	—
Fixed income securities:				
Government securities	25,437	—	25,437	—
Corporate bonds	4,981	—	4,981	—
Investment fund bonds	113,460	77,938	35,522	—
Other:				
Insurance policies	20,567	—	17,281	3,286
Total	\$ 285,060	\$ 147,449	\$ 134,325	\$ 3,286

	Fair value measurements at December 31, 2015			
	Total	Level 1	Level 2	Level 3
Cash and cash equivalents	\$ 40	\$ 40	\$ —	\$ —
Equity securities:				
U.S. investment funds	20,395	—	20,395	—
International investment funds	8,027	—	8,027	—
Fixed income securities:				
Government securities	13,214	—	13,214	—
Corporate bonds	11,002	—	11,002	—
Total	\$ 52,678	\$ 40	\$ 52,638	\$ —

The changes in the Level 3 pension plan assets for the year ended December 31, 2016 were as follows:

	Insurance policies
Balance at December 31, 2015	\$ —
Acquisition (May 4, 2016)	3,226
Actual return on plan assets	23
Benefits paid	(27)
Contributions	236
Exchange rate changes	(172)
Balance at December 31, 2016	\$ 3,286

The Company expects to contribute \$4,050 to the U.S. pension plans and \$3,679 to the foreign pension plans in 2017.

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The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

Year	U.S.	Foreign
2017	\$15,890	\$ 2,520
2018	14,808	2,520
2019	14,632	3,227
2020	15,100	2,983
2021	15,649	3,210
Years 2022-2026	77,082	20,654

Certain of the Company's foreign subsidiaries maintain other defined benefit plans that are consistent with statutory practices. These plans are not included in the disclosures above as they are not significant to the Company's consolidated financial statements.

Supplemental Retirement Plans

The following tables summarize changes in the benefit obligation, plan assets and funded status of the Company's defined benefit supplementary retirement plans, as well as the components of net periodic benefit cost, including key assumptions:

	December 31,	
	2016	2015
Change in benefit obligation:		
Benefit obligation at beginning of period	\$ —	\$ —
Interest cost	328	—
Net transfer in ⁽⁴⁾	14,671	—
Benefits paid	(767)	—
Actuarial gain	(1,007)	—
Benefit obligation at end of period	<u>\$ 13,225</u>	<u>\$ —</u>
Change in plan assets:		
Fair value of plan assets at beginning of period	\$ —	\$ —
Employer contributions	767	—
Benefits paid	(767)	—
Fair value of plan assets at end of period	<u>\$ —</u>	<u>\$ —</u>
Funded status of the plans (underfunded)	<u><u>\$ (13,225)</u></u>	<u><u>\$ —</u></u>

(4) Relates to the PQ Holdings defined benefit supplementary retirement plans assumed as part of the Business Combination.

Amounts recognized in the consolidated balance sheets consist of:

	December 31,	
	2016	2015
Current liability	\$ (1,170)	\$ —
Noncurrent liability	(12,055)	—
Accumulated other comprehensive loss	623	—
Net amount recognized	<u><u>\$ (12,602)</u></u>	<u><u>\$ —</u></u>

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Amounts recognized in accumulated other comprehensive income consist of:

	December 31,	
	2016	2015
Net gain	\$1,007	\$—
Gross amount recognized	1,007	—
Deferred income taxes	(384)	—
Net amount recognized	\$ 623	\$—

Components of net periodic benefit cost consist of:

	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31, 2014
	2016	2015	2014
Interest cost	\$ 328	\$ —	\$ —
Net periodic expense	\$ 328	\$ —	\$ —

There are no estimated net actuarial gains for the Company's defined benefit supplementary retirement plans that will be amortized from accumulated other comprehensive income into net periodic benefit cost in 2017.

The accumulated benefit obligation of our defined benefit supplemental retirement plans as of December 31, 2016 was \$13,225.

The discount rate used in determining the defined benefit supplemental retirement plan obligation was 3.90% as of December 31, 2016.

The discount rate used in determining net periodic benefit cost was 3.40% for the year ended December 31, 2016. The rate of compensation increase for the year ended December 31, 2016 was zero, as all future accruals were frozen for the defined supplemental retirement plans as of December 31, 2006.

The Company expects to contribute \$1,171 to the defined benefit supplementary retirement plans in 2017.

The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

Year	Amount
2017	\$ 1,171
2018	1,137
2019	1,101
2020	1,067
2021	1,031
Years 2022-2026	4,560

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Other Postretirement Benefit Plans

The following tables summarize changes in the benefit obligation, plan assets and funded status of the Company's other postretirement benefit plans as well as the components of net periodic benefit cost, including key assumptions:

	December 31,	
	2016	2015
Change in benefit obligation:		
Benefit obligation at beginning of period	\$ 1,296	\$ 1,327
Service cost	37	39
Interest cost	151	57
Employee contributions	176	—
Plan amendments	(443)	—
Benefits paid	(484)	—
Medical subsidies received	90	—
Premiums paid	(2)	—
Net transfer in ⁽⁵⁾	4,868	—
Actuarial gains	(1,057)	(127)
Translation adjustment	(12)	—
Benefit obligation at end of period	<u>\$ 4,620</u>	<u>\$ 1,296</u>
Change in plan assets:		
Fair value of plan assets at beginning of period	\$ —	\$ —
Employer contributions	220	—
Employee contributions	176	—
Benefits paid	(484)	—
Medical subsidies received	90	—
Premiums paid	(2)	—
Fair value of plan assets at end of period	<u>\$ —</u>	<u>\$ —</u>
Funded status of the plans (underfunded)	<u><u>\$(4,620)</u></u>	<u><u>\$(1,296)</u></u>

(5) Relates to the PQ Holdings retiree health plans assumed as part of the Business Combination.

Amounts recognized in the consolidated balance sheets consist of:

	December 31,	
	2016	2015
Current liability	(629)	(29)
Noncurrent liability	(3,991)	(1,267)
Accumulated other comprehensive income	877	127
Net amount recognized	<u><u>\$(3,743)</u></u>	<u><u>\$(1,169)</u></u>

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Amounts recognized in accumulated other comprehensive income consist of:

	December 31,	
	2016	2015
Net gain	\$1,163	\$ 127
Gross amount recognized	1,163	127
Deferred income taxes	(286)	—
Net amount recognized	<u>\$ 877</u>	<u>\$ 127</u>

Components of net periodic benefit cost consist of:

	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31, 2014
	2016	2015	
Service cost	\$ 37	\$ 39	\$ 3
Interest cost	151	57	5
Amortization of net gain	(17)	—	—
Net periodic expense (benefit)	<u>\$ 171</u>	<u>\$ 96</u>	<u>\$ 8</u>

The estimated net actuarial loss (gain) for the Company's retiree health plans that will be amortized from accumulated other comprehensive income into net periodic benefit cost in 2017 is (\$76). The estimated prior service cost (credit) for the Company's retiree health plans that will be amortized from accumulated other comprehensive income into net periodic benefit cost in 2017 is (\$78).

Significant weighted average assumptions used in determining the net periodic benefit cost, the postretirement benefit obligations and trend rate include the following:

	December 31,	
	2016	2015
Benefit obligation:		
Discount rate	3.74%	4.80%
Immediate trend rate	6.84%	N/A
Ultimate trend rate	4.50%	N/A
Year that the rate reaches ultimate trend rate	2035	N/A

	December 31,		
	2016	2015	2014
Benefit cost:			
Discount rate	3.92%	4.36%	4.36%
Immediate trend rate	7.28%	N/A	N/A
Ultimate trend rate	4.50%	N/A	N/A
Year that the rate reaches ultimate trend rate	2035	N/A	N/A

Note that the Eco Services retiree health plan only includes a life insurance and dental component; thus, the trend rate assumptions for 2015 were not applicable. The trend rate assumptions for 2016 reflect the acquired PQ Holdings retiree health plans.

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A 1% change in the assumed health care cost trend would have increased (decreased) the accumulated postretirement benefit obligation as of December 31, 2016 and the periodic postretirement benefit cost for the year then ended as follows:

	<u>1% Increase</u>	<u>1% Decrease</u>
Accumulated postretirement benefit obligation	152	(135)
Periodic postretirement benefit cost	4	(4)

The Company expects to contribute \$629 to the retiree health plans in 2017.

The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

<u>Year</u>	<u>Amount</u>
2017	\$ 629
2018	592
2019	500
2020	433
2021	384
Years 2022-2026	1,054

There are no expected Medicare subsidy receipts expected in future periods.

Certain of the Company's foreign subsidiaries maintain other postretirement benefit plans that are consistent with statutory practices. These plans are not included in the disclosures above as they are not significant to the Company's consolidated financial statements.

Predecessor Period

Solvay's Eco business unit received an allocation of the service cost, interest cost and expected return on plan assets of Eco Services' pension and other postretirement plans based on a combination of salaries and headcount. The amount of net pension and other postretirement benefit expense allocated to Solvay's Eco business unit related to these multiemployer plans was \$1,790 for the Predecessor Period from January 1, 2014 to November 30, 2014.

Defined Contribution Plans

The Company also has defined contribution plans covering domestic employees of the Company and certain subsidiaries. The Company recorded expenses of \$1,205 and \$1,511 related to these plans for the years ended December 31, 2016 and 2015, respectively, \$85 for the Successor Period from inception (July 30, 2014) to December 31, 2014, and \$1,848 for the Predecessor Period from January 1, 2014 to November 30, 2014.

20. Earnings per Share

During the period from January 1, 2014 to November 30, 2014, Solvay's Eco business unit did not have an independent capital structure. Because of the absence of an independent capital structure during this time, there was no earnings per share calculation for the Predecessor Period. From the December 1, 2014 closing date of the 2014 Acquisition to May 4, 2016, the date of the Business Combination, the Company was structured as a single

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member LLC, with capital contributions from affiliates of CCMP, the Company's board of managers and management represented by a class of membership units ("Eco Services Class A Units" or "Eco Services Membership Units"). During this period, Eco Services also granted incentive awards to certain employees, directors and affiliates in the form of Class B Units of Eco Services (the "Eco Services Class B Units"), which provided recipients with the option to purchase Eco Services Class A Units upon the attainment of certain vesting and other restrictions (see Note 21 to these consolidated financial statements for further information regarding the Company's equity incentive plans). At the date of the Business Combination, the existing Eco Services Class A Units were converted to Class B shares of PQ Group Holdings and the legacy PQ Holdings equity was converted to both Class A and Class B common shares of PQ Group Holdings. None of the Eco Class B Units had been exercised prior to the Business Combination, and all Eco Class B Units converted to Class A options of PQ Group Holdings at the date of the Business Combination (see Note 21).

The Company currently has two existing classes of common stock: Class A and Class B. Both Class A and Class B shares have been issued as restricted stock as part of the Company's stock incentive plan (see Note 21 to these consolidated financial statements for further information), which are generally subject to certain service and/or performance vesting conditions. Non-qualified incentive stock options to purchase Class A shares have also been issued as part of the Company's stock incentive plan, though no options had been exercised as of December 31, 2016. Class A and Class B shares have also been issued as purchases with no vesting restrictions. Holders of both Class A and Class B shares have rights to receive dividends and participate in earnings regardless of whether the shares have vested, but Class B shareholders have liquidation preference to receiving distributions before the holders of Class A common stock. Holders of vested Class A and Class B shares have equal voting rights, but for unvested shares, only the holders of Class B shares have voting rights, whereas holders of unvested Class A shares do not have voting rights.

Of the 626,135 shares of outstanding Class A common stock as of December 31, 2016, 429,985 shares were vested. With respect to the 6,726,907 shares of outstanding Class B common stock as of December 31, 2016, 6,676,813 shares were vested.

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. In periods of income, the income is shared equally amongst Class A and B common stockholders. In the event of liquidation, the holders of Class B common stock have preference to receiving distributions before the holders of Class A common stock. As a result, holders of Class B common stock are considered preferential participating securities and will not be allocated any losses in the periods of net losses, but will be allocated income in the periods of net income using the two-class method.

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. Potential shares reflect the unvested Class A and Class B shares as well as options to purchase Class A shares and Eco Services membership units, which have been included in the diluted earnings per share calculation using the treasury stock method. For purposes of calculating diluted earnings per share, income has been reallocated between the classes based on the diluted weighted average number of common shares outstanding for each class. In periods of net loss, inclusion of potential common shares would be anti-dilutive.

For both the basic and dilutive weighted average unit calculations, as a result of the Business Combination, the number of Eco Services membership units outstanding from January 1, 2016 through May 4, 2016, the date of the Business Combination, as well as for the historical periods presented for the year ended December 31,

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2015 and the period from inception (July 30, 2014) to December 31, 2014 (Successor Period), were computed on the basis of the weighted average units outstanding for Eco Services during the respective periods multiplied by the exchange ratio established for Class B shares as part of the Business Combination. For the year ended December 31, 2015 and for the Successor 2014 period, Eco related units were retrospectively reflected as Class B shares for earnings per share purposes including in periods of loss since during these periods this was the only class of share in existence to absorb income and losses.

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

	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31,
	2016	2015	2014
Weighted average shares outstanding—Basic—Class B:	4,947,982	1,507,719	1,492,682
Dilutive effect of unvested Class B shares with service conditions	—	—	—
Weighted average shares outstanding—Diluted—Class B:	<u>4,947,982</u>	<u>1,507,719</u>	<u>1,492,682</u>
Weighted average shares outstanding—Basic—Class A:	430,051	—	—
Dilutive effect of assumed stock option exercises and conversions	—	—	—
Weighted average shares outstanding—Diluted—Class A:	<u>430,051</u>	<u>—</u>	<u>—</u>

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The following table reconciles the components of basic and diluted income (loss) per share for the years ended December 31, 2016 and 2015, and for the period from inception (July 30, 2014) to December 31, 2014 (Successor period):

	Years ended December 31,		Successor period from inception (July 30, 2014) to December 31,
	2016	2015	2014
Numerator:			
Net income (loss) available to PQ Group Holdings common shareholders	\$ (79,746)	\$ 11,427	\$ (22,061)
Denominator:			
Weighted average shares outstanding—Basic:			
Class B shares	4,947,982	1,507,719	1,492,682
Class A shares	430,051	—	—
Total weighted average shares outstanding—Basic	<u>5,378,033</u>	<u>1,507,719</u>	<u>1,492,682</u>
Weighted average shares outstanding—Diluted:			
Class B shares	4,947,982	1,507,719	1,492,682
Class A shares	430,051	—	—
Total weighted average shares outstanding—Diluted	<u>5,378,033</u>	<u>1,507,719</u>	<u>1,492,682</u>
Basic net income (loss) per share:			
Class B shares	\$ —	\$ 7.58	\$ (14.78)
Class A shares	\$ (185.43)	\$ —	\$ —
Diluted net income (loss) per share:			
Class B shares	\$ —	\$ 7.58	\$ (14.78)
Class A shares	\$ (185.43)	\$ —	\$ —

21. Stock-Based Compensation:

Eco Services Class B Units

Prior to the Business Combination, the Company recognized stock-based compensation expense for incentive awards issued under the Eco Services Group Holdings Incentive Unit Agreement dated December 29, 2014 (the “Incentive Unit Agreement”). Under the Incentive Unit Agreement, the Company granted a total of 25,786 of Eco Services Class B Units to certain employees, directors and affiliates of the Company at an exercise price of \$1,000/unit. Of this amount, 14,419 and 11,367 of Eco Services Class B Units were granted on January 13, 2015 and December 29, 2014, respectively. Immediately prior to the date of the Business Combination on May 4, 2016 and as of December 31, 2015, there were 25,093 of Eco Services Class B Units outstanding.

Of this total, 10,674 Eco Services Class B Units granted to employees (the “Management Awards”) had two vesting criteria, in which 50% were subject to a service (time-based) vesting condition and 50% were subject to a performance condition. The Eco Services Class B Units subject to the service condition vest 25% annually, with the first annual vesting date of December 1, 2015. The remaining 14,419 of Eco Services Class B Units awarded to directors and affiliates (the “Director Awards”) were subject to a service vesting condition only, consistent

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with that of the Management Awards. The Eco Services Class B Units did not have a contractually defined maximum term. All of the Eco Services Class B Units were valued using a Black-Scholes option pricing model, and the fair value of an Eco Services Class B Unit was \$448/unit. The key assumptions used in valuing the Eco Services Class B Units were as follows: expected term of seven years, expected volatility of 40.27%, risk-free interest rate of 2.02% and expected dividend yield of 0.00%.

The expected term represents the period of time over which the Eco Services Class B Units are expected to be outstanding prior to exercise or forfeiture. With the limited experience of the Company with respect to historical exercise and forfeiture rates or patterns, the expected term was estimated in the context of the four-year service award vesting as well as the timeframe for a liquidity event for the performance awards. The expected volatility was based on the actual stock price volatility of a peer group of companies. The risk-free interest rate was based on U.S. Treasury rates in effect at the time of the grants commensurate with the expected term. There was no dividend yield assumption since the Company has not paid dividends nor does it have an expectation of future dividend payouts.

The following table summarizes the activity of the Eco Services Class B Units during the year ended December 31, 2015 and through May 3, 2016, the date immediately preceding the Business Combination:

	<u>Number of units</u>	<u>Weighted average exercise price</u>
Outstanding at December 31, 2014	11,367	\$ 1,000
Granted	14,419	\$ 1,000
Forfeited	(693)	\$ 1,000
Outstanding at December 31, 2015 and May 3, 2016	<u>25,093</u>	\$ 1,000
Exercisable at December 31, 2015 and May 3, 2016	<u>4,939</u>	\$ 1,000

For the period from January 1, 2016 through May 3, 2016 and for the year ended December 31, 2015, the Company recognized stock-based compensation expense of \$766 and \$2,256, respectively, related to the Eco Services Class B Units. Since the Company was not subject to income taxes prior to the Business Combination, there was no tax benefit associated with the expense. The expense related to the 50% of the Management Awards and all of the Director Awards subject to the service condition, and was recognized on a straight-line basis over the vesting period for the awards. The 50% of the Management Awards subject to the performance condition only vest when specific liquidity events occur. As of May 3, 2016 and December 31, 2015, the performance-based criteria of the Management Awards was not considered probable, and therefore no expense for the Management Awards subject to the performance condition has been recognized.

The total fair value of Eco Services Class B Units that vested during the year ended December 31, 2015 was \$2,213. No Eco Services Class B Units vested from the period from January 1, 2016 through May 3, 2016.

PQ Group Holdings Awards

In conjunction with the Business Combination, the Company adopted a new incentive plan, namely the PQ Group Holdings Inc. Stock Incentive Plan. Under the terms of the plan, the Company is authorized to issue a total of 908,189 shares for Class A awards to employees, directors and affiliates of the Company, while the number of Class B awards that may be granted is determined by the Board of Directors from time-to-time. As part of the Business Combination, the 25,093 of outstanding Eco Services Class B Units at the date of the Business

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Combination were canceled and replaced with 156,139 of PQ Group Holdings Class A Options (the "Class A Options") to purchase PQ Group Holdings Class A common stock at an exercise price of \$70.94/share. The Eco Services Class B Units were replaced by Class A Options in accordance with a formula to convert such awards, plus a vested cash component. The terms of the new awards were substantially identical to those in effect prior to the Business Combination, except for adjustments to the underlying number of shares (based on the conversion ratio) and the exercise price, which was now based on PQ Group Holdings Inc. Class A common stock. Additionally, although the Eco Services Class B Units did not have a contractually defined maximum term, the maximum term of the Class A Options is ten years.

The Company accounted for the cancelation and replacement (including a cash component) as a combination of a modification and a cash settlement. This resulted in no incremental compensation cost recognized at the time of the modification, but led to an acceleration of \$1,174 of previously measured but unrecognized compensation cost.

The Class A Options were valued using a Black-Scholes option pricing model, and the fair value of a Class A Option at the modification (merger) date was \$29.43. The key assumptions used in valuing the Class A Options were as follows: expected term of five years, expected volatility of 45.79%, risk-free interest rate of 1.54% and expected dividend yield of 0.00%.

With the limited experience of the Company with respect to historical exercise and forfeiture rates or patterns, the expected term was estimated in the context of the service award vesting period as well as the timeframe for a liquidity event for the performance awards, along with the ten year contractual maximum term. The expected volatility was compared to a range of the actual stock price volatility of a peer group of companies. The risk-free interest rate was based on U.S. Treasury rates in effect at the time of the grant commensurate with the expected term. There was no dividend yield assumption since the Company has not paid dividends nor does it have an expectation of future dividend payouts.

In addition to the Eco Services Class B Units that were canceled and replaced at the time of the Business Combination, the Company exchanged the outstanding option awards of PQ Holdings for options of PQ Group Holdings in connection with the merger. The terms of the PQ Group Holdings awards were substantially identical to those of the PQ Holdings awards, including the number of underlying shares and vesting conditions, with the exception of an exercise price of \$70.94/share for the Class A Options. There are various vesting conditions associated with the exchanged awards, including satisfaction of certain service and performance based conditions.

The following table summarizes the activity of the Class A Options for the period from the date of the Business Combination of May 4, 2016 through December 31, 2016, which includes both the Eco Services Class B Units that were canceled and replaced, as well as the PQ Holdings options that were exchanged:

	Number of options	Weighted average exercise price
Granted/assumed on May 4, 2016 in connection with the Business Combination	196,945	\$ 70.94
Granted	61,049	\$ 71.01
Forfeited	(54,262)	\$ 70.94
Outstanding at December 31, 2016	<u>203,732</u>	\$ 70.96
Exercisable at December 31, 2016	<u>61,457</u>	\$ 70.94

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In addition to the exchange of the PQ Holdings options, the Company also exchanged PQ Holdings restricted stock for 197,144 shares of Class A restricted stock (“Class A Restricted Stock”) and 46,936 shares of Class B restricted stock (“Class B Restricted Stock”) of PQ Group Holdings. The Class A and Class B Restricted Stock were issued at substantially identical terms to the original PQ Holdings awards, with the exception of a new price ascribed to the shares.

The shares of the Class A restricted stock were all subject to the same vesting requirement that was identical to the original awards, namely a performance condition. As defined in the award agreements, each grant fully vests upon the occurrence of a defined liquidity event upon which certain investment funds affiliated with CCMP receive proceeds exceeding certain thresholds, subject to the employee’s continued service with the Company through the vesting date. The Class A restricted stock was valued at \$70.94/share at the date of the exchange (merger date), with the fair value determined using multiples of EBITDA and the income approach, based on a discounted free cash flow model. Since all of the Class A restricted stock is subject to a performance condition that was not deemed probable for the period from the consummation of the Business Combination through December 31, 2016, no expense for the Class A restricted stock was recognized.

The shares of the Class B restricted stock were all subject to vesting requirements identical to the original awards, which included the satisfaction of certain service and performance based conditions. The Class A restricted stock was valued at \$184.80/share at the date of the exchange (merger date), with the fair value determined using multiples of EBITDA and the income approach, based on a discounted free cash flow model.

The following table summarizes the activity of the Class A and Class B Restricted Stock for the period from the date of the Business Combination of May 4, 2016 through December 31, 2016:

	Number of shares		Weighted average grant date fair value (per share)	
	Class A	Class B	Class A	Class B
Nonvested awards assumed on May 4, 2016 in connection with the Business Combination	197,114	46,936	\$ 70.94	\$ 184.80
Granted	—	15,862	\$ —	\$ 184.80
Vested	—	(11,926)	\$ —	\$ 184.80
Forfeited	(964)	(778)	\$ 70.94	\$ 184.80
Nonvested awards at December 31, 2016	<u>196,150</u>	<u>50,094</u>	\$ 70.94	\$ 184.80

The exchange of the PQ Holdings options and restricted stock for awards of PQ Group Holdings in the context of a business combination was accounted for as a modification of the awards. As a result, the cost of the replacement awards of PQ Group Holdings represents a combination of both pre- and post-merger services. The amount attributable to services prior to the Business Combination in connection with the modification was \$1,401, and is considered part of the consideration transferred in the Business Combination (see Note 7 to these consolidated financial statements for further information). The remainder of the cost is attributed to post-merger services and is being recognized over the respective remaining vesting periods.

For the years ended December 31, 2016 and 2015, total stock-based compensation expense for the Company (inclusive of both the Eco Services Class B Units prior to the Business Combination and the awards replaced or exchanged at the consummation of the Business Combination) was \$7,029 and \$2,256, respectively. The income tax benefit recognized in the statement of operations for the year ended December 31, 2016 was \$3,300 (there was no tax benefit for the year ended December 31, 2015 since the Company was not subject to income taxes).

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Historically, Solvay maintained various share-based compensation plans for employees during the Predecessor Period. Employees participated in these share-based payment plans. Upon the 2014 Acquisition, all existing Solvay awards for Eco Services employees were terminated. Accordingly, no further stock-based compensation expense related to Solvay awards was provided in the Successor Period.

In the Predecessor Period, stock-based compensation expense was recognized on a straight-line basis in the statement of operations over the vesting periods relating to these awards. Share-based payment expense recognized during the Predecessor Period was \$535. For purposes of determining the fair value of stock option awards, Solvay used the Black-Scholes option pricing model.

22. Commitments and Contingent Liabilities:

Environmental

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.

PQ Holdings 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 PQ Holdings' 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, PQ Holdings 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, NJ facility has been completed and is closed from an ISRA standpoint, but as of December 31, 2016, the Company has recorded a reserve of \$700 for costs required for contamination assessment and removal work at Rahway, NJ. 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 PQ Holdings Chester facility conducted limited paint sampling for polychlorinated biphenyls ("PCBs"). Also, as part of demolition, repair and maintenance projects scheduled for the PQ Holdings' Baltimore facility in 2014, PQ Holdings 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 PQ Holdings 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

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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 is currently in process. As of December 31, 2016, the Company recorded a reserve of \$1,048 for the anticipated remediation costs of known PCB painted structures at the Company's Baltimore and Chester 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. In January 2017, a hearing to review the merits of PQ's appeal to the Environmental Hearing Board was held, followed by a 90 to 120 day briefing period after which the judge should render an opinion. As of December 31, 2016, the Company has recorded a reserve of \$1,500 associated with the PADEP penalty.

As part of the Business Combination, the Company acquired 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 December 31, 2016, the Company has recorded a reserve of \$532 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 some, but not all, of the alleged contamination. As of December 31, 2016, the Company has recorded a reserve of \$913, for costs related to this potential liability.

The Company has recorded a reserve of \$1,776 as of December 31, 2016 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 RWQCP has agreed that Eco 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 now working with the RWQCP 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.

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As of December 31, 2016, the Company has recorded a reserve of \$1,755 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. Eco Services is now preparing an action plan to address this matter.

Leases

The Company has entered into various lease agreements for the rental of office and plant facilities, railcars, machinery and equipment, substantially all of which are classified as operating leases. Total rent expense under these agreements was \$16,315 and \$6,096 for the years ended December 31, 2016 and 2015, respectively and \$471 and \$5,647 for the Successor and Predecessor periods, respectively.

Total rent due under non-cancelable operating lease commitments as of December 31, 2016 is:

Year	Amount
2017	\$16,541
2018	10,079
2019	7,187
2020	5,812
2021	4,395
Thereafter	11,539
	<u>\$55,553</u>

Purchase Commitments

The Company has entered into short and long-term purchase commitments for various key raw materials and energy requirements. The purchase obligations include agreements to purchase goods that are enforceable and legally binding, and that specify all significant terms. The purchase commitments covered by these agreements are with various suppliers and total approximately \$34,310 as of December 31, 2016.

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Purchases under these agreements are expected to be:

<u>Year</u>	<u>Amount</u>
2017	\$17,206
2018	11,276
2019	764
2020	766
2021	764
Thereafter	3,534
	<u>\$34,310</u>

Other

PQ Holdings was previously liable to the seller of a business for potential multi-year UK tax benefits derived from the acquisition. PQ Holdings was contractually obligated to make a payment on an annual basis on its UK taxable results, which fluctuate period-to-period, until there was a change in control, as defined in the purchase agreement. As a result of the Business Combination, a change in control was triggered, and PQ Holdings is no longer liable for additional accruals under the arrangement as of May 4, 2016. At December 31, 2016, the Company has accrued \$1,919 for this arrangement, representing the expected payment owed on the calculation of the liability for the tax years 2016 (through May 4, 2016) and 2015. The Company recorded these expenses as transaction and other related costs in other operating expense, net in the Company's consolidated statements of operations.

23. Restructuring and Other Related Costs:

The following table presents the components of restructuring and other related costs for the years ended December 31, 2016 and 2015, and the period from inception (July 30, 2014) to December 31, 2014 (Successor period) included in other operating expenses, net, in the accompanying consolidated statements of operations:

	<u>Years ended</u> <u>December 31,</u>		<u>Successor</u> <u>period from</u> <u>inception</u> <u>(July 30,</u> <u>2014) to</u> <u>December 31</u> <u>2014</u>
	<u>2016</u>	<u>2015</u>	
Severance and other employee costs related to restructuring plan	\$ 5,093	\$3,971	\$ 247
Other related costs	7,537	176	—
	<u>\$12,630</u>	<u>\$4,147</u>	<u>\$ 247</u>

Restructuring Plan

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

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when payment of the benefits becomes probable and estimable. Charges related to severance costs for the restructuring plan under ongoing benefit plan arrangements were \$5,093 and \$1,293 for the years ended December 31, 2016 and 2015.

Additionally, certain one-time costs related to retention bonuses were also recognized as part of the restructuring plan. The Company recognizes costs under one-time benefit arrangements by measuring the liability as of the employee communication date, which is based on the estimated fair value of the liability at the termination date, and recognizing the liability ratably over the required future service period based on the terms of the arrangement. Charges related to one-time costs for the restructuring plan were \$2,678 for the year ended December 31, 2015 and \$247 for the period from inception (July 30, 2014) to December 31, 2014 (Successor period).

Costs related to the restructuring plan affected employees in the Company's EC&S segment, although these costs are excluded from the segment's measure of profitability of Adjusted EBITDA (see Note 12 to these consolidated financial statements for further information). The activity in the accrued liability balance associated with the restructuring plan, all of which related to severance and other employee costs, was as follows for the years ended December 31, 2016 and 2015, and the period from inception (July 30, 2014) to December 31, 2014:

Balance at July 30, 2014	\$ —
Restructuring charges	<u>247</u>
Balance at December 31, 2014	\$ 247
Restructuring charges	3,971
Cash payments and other adjustments	<u>(2,925)</u>
Balance at December 31, 2015	\$ 1,293
Restructuring charges	5,093
Cash payments	<u>(4,743)</u>
Balance at December 31, 2016	<u>\$ 1,643</u>

The remaining accrued liability balance associated with the restructuring plan at December 31, 2016 is expected to be paid in 2017.

Other Related Costs

The Company incurred severance and other business optimization costs of \$7,537 and \$176 for the years ended December 31, 2016 and 2015, 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.

24. Relationship with Solvay:

Years Ended December 31, 2016 and 2015, and the Successor Period

Transition Services Agreement

Concurrent with the consummation of the 2014 Acquisition, Eco Services entered into a transition services agreement with Solvay (the "Transition Services Agreement"), which provided certain transition services by

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
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Solvay to Eco Services and from Eco Services to Solvay. The services from Solvay included the provision of information technology services, certain workspace related services, cost accounting services and consulting services, among others. The Transition Services Agreement was terminated as of December 31, 2015. The Company recorded \$4,882 and \$462 of fees for the transition services provided in selling, general and administrative expenses for the year ended December 31, 2015 and for the period from inception (July 30, 2014) to December 31, 2014, respectively.

Cross-Services Agreement

In connection with the 2014 Acquisition, Eco Services entered into a Cross-Services Agreement (the “CSA”) with Aroma Performance, a Solvay business unit (“Aroma”), on July 28, 2014. The CSA pertains to Eco Services’ Baton Rouge, LA site. In connection with the CSA, Eco Services (and now the Company) agreed to continue to provide certain services that it historically provided to Aroma when it operated as a component of Solvay, including its well water and process steam requirements, for an initial term of five years. Further, Eco Services also agreed to provide Aroma with the use of space, operating machinery and handling of chemicals on the site.

Under the CSA, the Company sells product to Aroma on an ongoing basis. Sales under the CSA totaled \$1,047 and \$1,272 for the years ended December 31, 2016 and 2015, respectively, and \$124 for the period from inception (July 30, 2014) to December 31, 2014 (Successor period). The Company also provides hazardous waste removal services to Aroma under the CSA. Sales related to the hazardous waste removal services were \$1,615 and \$1,544 for the years ended December 31, 2016 and 2015, respectively, and \$23 for the period from inception (July 30, 2014) to December 31, 2014 (Successor period).

The Company incurs certain shared costs, such as electricity, steam, other utility and plant administration costs, all of which are charged to Aroma primarily based on direct usage. The Company charged Aroma \$2,686 and \$3,745 for such expenses for the years ended December 31, 2016 and 2015, respectively, and \$407 for the period from inception (July 30, 2014) to December 31, 2014 (Successor period).

Silica Sales Agreement

In connection with the 2014 Acquisition, Eco Services entered into an agreement (the “Silica Sales Agreement”) with Solvay’s Silica business unit (“Silica”) pursuant to which Eco Services agreed to provide Silica with sulfuric acid produced at its Hammond, IN plant for a term of five years, renewing automatically for one year terms thereafter. Eco Services historically provided sulfuric acid to Silica when it operated as a component of Solvay, and the Company continues to sell product to Solvay under the Silica Sales Agreement on an ongoing basis. These sales totaled \$1,743 and \$1,983 for the years ended December 31, 2016 and 2015, respectively, and \$145 for the period from inception (July 30, 2014) to December 31, 2014.

Predecessor Period

Allocation of General Corporate and Other Expenses

The Predecessor Period includes expense allocations for certain functions provided by Solvay and Solvay SA including, but not limited to, finance, legal, information technology, human resources and regulatory. These expenses have been allocated to Solvay’s Eco business unit on the basis of direct usage when identifiable, with the remainder allocated on the basis of revenue or headcount. For the period from January 1, 2014 to November 30, 2014, Solvay’s Eco business unit was allocated \$12,942, with such amounts included in selling, general and administrative expenses within the statement of operations.

PQ GROUP HOLDINGS INC. AND SUBSIDIARIES
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(Dollars in thousands, except share and per share amounts)

In addition, the Predecessor Period includes expense allocations from Solvay for employee benefit costs, including payroll taxes, group medical, dental and life insurance, postemployment and other benefits. These costs have been allocated on the basis of total salary expense. For the period from January 1, 2014 to November 30, 2014, Solvay's Eco business unit was allocated \$14,062 of employee benefit costs incurred by Solvay. For the period from January 1, 2014 to November 30, 2014, Solvay's Eco business unit was allocated \$565 of rent expense for shared facilities on the basis of sales.

The expense allocations have been determined on a basis that management considers to be a reasonable reflection of the utilization of services provided or the benefit received by Solvay's Eco business unit during the periods presented. The allocations may not, however, reflect the expense Solvay's Eco business unit would have incurred as an independent company for the periods presented. Actual costs that may have been incurred if Solvay's Eco business unit had been a stand-alone company would depend on a number of factors, including the chosen organization structure, which functions were outsourced or performed by employees and strategic decisions made in areas such as information technology and infrastructure.

Related Party Transactions

Solvay's Eco business unit sold product to two other Solvay business units, with revenue recorded equivalent to cost incurred. These sales totaled \$1,541 for the period from January 1, 2014 to November 30, 2014.

Solvay's Eco business unit also provided hazardous waste removal services to one of these other Solvay business units at cost. Such sales totaled \$754 for the period from January 1, 2014 to November 30, 2014. Solvay's Eco business unit also operated a facility that is shared with another Solvay business unit. Solvay's Eco business unit incurs certain shared costs, such as electricity, steam, other utility costs and plant administration costs, all of which are charged to this other business unit primarily based on direct usage. Solvay's Eco Services business unit charged \$5,799 for such expenses for the period from January 1, 2014 to November 30, 2014, with such amounts included as a reduction to cost of sales in the statement of operations.

Parent Company Investment

Under the Predecessor Period presentation, which lacks an independent capital structure, it is not meaningful to show share capital or retained earnings for Solvay's Eco business unit. The net assets are represented by the cumulative investment in Solvay's Eco business unit by Solvay, which is shown as Parent company investment comprised of the accumulated earnings of Solvay's Eco business unit and net transfers to/from the Parent.

All significant intercompany transactions between Solvay's Eco business unit and Solvay have been included in the Predecessor Period and are considered to be effectively settled for cash at the time the transaction is recorded. The total net effect of the settlement of these intercompany transactions is reflected in the statements of cash flows as a financing activity as Parent company investment. Net transfers to/from Solvay are deemed borrowings and repayments to Solvay associated with Solvay's centralized treasury function (for which bifurcation between gross borrowings and gross repayments is not practical). Accordingly, such activity is deemed a net financing activity for cash flow presentation purposes.

25. Long-term Supply Contract:

As part of Solvay's 2004 sale of its Specialty Phosphates business, Solvay agreed to continue to supply sulfuric acid to a third party in support of the phosphoric acid production for its specialty phosphates business

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

under a preexisting supply agreement. This non-cancelable agreement extends to 2031, and was assumed by the Company in connection with the 2014 Acquisition.

The liability associated with this supply agreement was recorded at an estimated fair value of \$27,300 in connection with the 2014 Acquisition. The fair value was determined by appraisal, based on the marked up price of the sulfuric acid over the price per the supply agreement, or mark up. The liability was \$23,888 and \$25,526 at December 31, 2016 and 2015, respectively, and is being amortized to cost of goods sold over the remaining term of the agreement.

26. Related Party Transactions:

The Company maintains certain policies and procedures for the review, approval and ratification of related party transactions to ensure that all transactions with selected parties are fair, reasonable and in the Company's best interests. All significant relationships and transactions are separately identified by management if they meet the definition of a related party or a related party transaction. Related party transactions include transactions that occurred during the year, or are currently proposed, in which the Company was or will be a participant, and for which any related person had or will have a direct or indirect material interest. All related party transactions are reviewed, approved and documented by the appropriate level of the Company's management in accordance with these policies and procedures.

On December 29, 2014, PQ Holdings, CCMP and PQ Corporation entered into a consulting agreement relating to the provision of certain financial and strategic advisory services and consulting services. Similarly, the consulting agreement between PQ Holdings, INEOS Capital Partners and PQ Corporation was amended and restated. Under the new consulting agreements, the Company agreed to pay an annual monitoring fee of \$5,000 distributed to CCMP and INEOS AG equal to the Pro Rata Percentage, as defined, between CCMP and INEOS AG. The Company recorded \$3,584 of management advisory fees in other operating expense in the consolidated statements of operations for the year ended December 31, 2016.

Advisory Services and Monitoring Agreement

Concurrent with the consummation of the 2014 Acquisition, the Company entered into an advisory services and monitoring agreement with CCMP, pursuant to which CCMP provided certain advisory services to the Company. Pursuant to the advisory services and monitoring agreement, CCMP and certain members of the Company's management and board of managers were paid a one-time fee on the Closing Date of \$8,000 related to the 2014 Acquisition, Senior Secured Credit Facilities and 2022 Notes transactions, and CCMP received (i) an annual advisory fee of \$500 and (ii) reimbursement for reasonable out-of-pocket expenses incurred in connection with the provision of services, including the reasonable fees and disbursements of legal counsel and other advisors retained by CCMP and travel and reasonable out-of-pocket expenses of each director appointed by CCMP to the Company's board of managers or the board of directors of its affiliates, and of any other representative of CCMP in connection with their provision of such services. The advisory services and monitoring agreement also provided for customary exculpation, indemnification and confidentiality provisions. The one-time management fee was recorded by the Company as an increase to selling, general, and administrative expenses.

Effective January 1, 2015, the Company entered into a service agreement with CCMP (the "Services Agreement") for the provision of services historically provided by Solvay. The services include product information and operations support, manufacturing support, electronic data processing and systems support, employee relations, and financial services. The Company recorded \$1,616 for these services and reimbursable

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

expenses provided under the Service Agreement, which was recorded in selling, general and administrative expenses for the year ended December 31, 2015.

Pursuant to the advisory services and monitoring agreement, the Company agreed to pay certain investors a one-time fee of \$1,600 for services provided related to the 2014 Acquisition. On January 13, 2015, pursuant to a payment direction and subscription agreement, in lieu of the Company paying this fee, these investors agreed to contribute the \$1,600 transaction fee to the capital of Eco Services Group Holdings LLC (“Holdings”). Holdings contributed this fee to Eco Services Intermediate Holdings LLC (“Intermediate Holdings”). Intermediate Holdings in turn contributed this transaction fee to the Company, increasing the Company’s additional paid-in capital by \$1,600.

Transactions with Management and Board of Managers

For the year ended December 31, 2015, certain members of the Company’s board of managers and management contributed \$1,538 in cash, which was invested directly into Holdings. Holdings contributed these proceeds to Intermediate Holdings. Intermediate Holdings in turn contributed the proceeds to the Company, increasing the Company’s additional paid-in capital by \$1,538.

Transactions with Board of Directors

In connection with the offering by PQ Corporation of \$525.0 million aggregate principal amount of Senior Unsecured Notes due 2022 in May 2016, a member of our board of directors purchased \$4 million in principal amount of such notes. Interest accrues on the notes at an annual rate equal to three-month LIBOR plus 10.75%, with a 1.0% LIBOR floor, payable and reset quarterly. The director received interest payments in respect of the notes totaling \$0.3 million during the year ended December 31, 2016 and has not received any repayment in respect of the principal amount of such notes.

Joint Venture Agreement

The Company entered into a joint venture agreement (the “ZI Partnership Agreement”) in 1988 with CRI Zeolites Inc., a Royal Dutch Shell plc affiliate, to form Zeolyst International, our 50/50 joint venture partnership (the “Partnership”). Under the terms of the ZI Partnership Agreement, the Partnership leases certain land used in its Kansas City production facilities from PQ Corporation. This lease, which has been recorded as an operating lease, provided for rental payments of \$187 for the year ended December 31, 2016. The terms of this lease are evergreen as long as the ZI Partnership Agreement is in place. The Partnership purchases certain of its raw materials from the Company and is charged for various manufacturing costs incurred at the Company’s Kansas City production facility. The amount of these costs charged to the Partnership during the year ended December 31, 2016 was \$10,707. Certain administrative, marketing, engineering, management-related, and research and development services are provided to the Partnership by the Company. During the year ended December 31, 2016, the Partnership was charged \$8,169 for these services. In addition, the Partnership was charged certain product demonstration costs of \$1,663 during the year ended December 31, 2016.

Other

From time to time, the Company makes sales to portfolio companies of funds that are affiliated with CCMP and companies that are affiliated with INEOS Capital Partners, but these sales are not material.

27. Subsequent Events:

The Company has evaluated subsequent events since the balance sheet date through June 9, 2017, the date the financial statements were issued, and determined there are no additional items to disclose.

SCHEDULE I
PQ GROUP HOLDINGS INC. AND SUBSIDIARIES (PARENT)
CONDENSED FINANCIAL INFORMATION
CONDENSED BALANCE SHEET
(in thousands)

	December 31, 2016
ASSETS	
Total current assets	\$ —
Investment in subsidiaries	1,022,880
Total assets	<u>\$ 1,022,880</u>
LIABILITIES	
Total current liabilities	\$ —
Total liabilities	<u>\$ —</u>
STOCKHOLDERS' EQUITY	
Common stock, Class A (\$0.01 par); authorized shares 160,500,000; issued shares 627,251; outstanding shares 626,617 on December 31, 2016	6
Common stock, Class B (\$0.01 par); authorized shares 30,000,000; issued shares 6,727,685; outstanding shares 6,726,907 on December 31, 2016	67
Additional paid-in capital	1,167,137
Accumulated deficit	(90,380)
Treasury stock, at cost; shares 1,116 (Class A) and 778 (Class B) on December 31, 2016	(239)
Accumulated other comprehensive loss	<u>(53,711)</u>
Total PQ Group Holdings Inc. stockholders' equity	<u>1,022,880</u>
Total liabilities and stockholders' equity	<u>\$ 1,022,880</u>

See accompanying notes to condensed financial statements.

SCHEDULE I
PQ GROUP HOLDINGS INC. AND SUBSIDIARIES (PARENT)
CONDENSED FINANCIAL INFORMATION
CONDENSED STATEMENT OF OPERATIONS
(in thousands)

	For the Year Ended December 31, 2016
Stock compensation expense	\$ 7,029
Equity in loss of subsidiaries	(72,717)
Net loss	(79,746)
Other comprehensive income (loss), net of tax	
Pension and postretirement benefits	6,865
Net gain from hedging activities	4,557
Foreign currency translation	(65,781)
Total other comprehensive loss	(54,359)
Comprehensive loss	\$ (134,105)

See accompanying notes to condensed financial statements.

SCHEDULE I
PQ GROUP HOLDINGS INC. AND SUBSIDIARIES (PARENT)
CONDENSED FINANCIAL INFORMATION
CONDENSED STATEMENT OF CASH FLOWS
(in thousands)

	For the Year Ended December 31, 2016
Cash flows from operating activities:	
Net loss	\$ (79,746)
Adjustments to reconcile net loss to net cash provided by operating activities:	
Equity in net loss from subsidiaries	72,717
Stock compensation expense	7,029
Net cash provided by operating activities	<u>—</u>
Cash flows from investing activities:	
Net cash used in financing activities	<u>—</u>
Cash flows from financing activities:	
Net cash used in financing activities	<u>—</u>
Effect of exchange rate changes on cash	<u>—</u>
Net change in cash and cash equivalents	<u>—</u>
Cash and cash equivalents at beginning of period	<u>—</u>
Cash and cash equivalents at end of period	<u>\$ —</u>

See accompanying notes to condensed financial statements.

SCHEDULE I
PQ GROUP HOLDINGS INC. AND SUBSIDIARIES (PARENT)
CONDENSED FINANCIAL INFORMATION
NOTES TO CONDENSED SCHEDULE I

1. Description of PQ Group Holdings Inc. and Subsidiaries

On August 17, 2015, 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”), INEOS Capital Partners (“INEOS”) and certain other 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. (“PQ Group Holdings” or the “Parent Company”). The reorganization 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 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 Parent Company condensed financial statements are the continuation of Eco Services’ business prior to the Business Combination.

PQ Group Holdings is a holding company that conducts substantially all of its business operations through its wholly owned subsidiary, PQ Corporation. As specified in certain of PQ Corporation’s debt agreements entered into concurrently with the Business Combination, there are restrictions on the ability of PQ Corporation to make payments to its stockholder, PQ Group Holdings, on behalf of their equity interests (refer to Note 15 to our Consolidated Financial Statements entitled “Long-term Debt”).

2. Basis of Presentation

The accompanying condensed Parent Company only financial statements are required in accordance with Rule 4-08(e)(3) of Regulation S-X. These condensed financial statements have been presented on a “parent-only” basis. Under a parent-only presentation, the Parent Company’s investment in its consolidated subsidiary is presented under the equity method of accounting. Under the equity method, investment in its subsidiaries is stated at cost plus contributions and equity in undistributed income (loss) of subsidiary less distributions received since the date of acquisition. For purposes of presenting net income, this presentation assumes that the Parent Company was in existence for the full year ended December 31, 2016. These parent-only financial statements should be read in conjunction with PQ Group Holdings’ audited Consolidated Financial Statements included elsewhere herein.

3. Stock-Based Compensation

Refer to Note 21 of the notes to consolidated financial statements in this prospectus for a description of Stock-Based Compensation.

4. Common Stock

Refer to Note 20 of the notes to consolidated financial statements in this prospectus for a description of Common Stock.

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

	June 30, 2017	December 31, 2016
ASSETS		
Cash and cash equivalents	\$ 50,457	\$ 70,742
Receivables, net	224,605	160,581
Inventories	236,508	227,048
Prepaid and other current assets	26,804	34,307
Total current assets	538,374	492,678
Investments in affiliated companies	467,670	459,406
Property, plant and equipment, net	1,203,925	1,181,388
Goodwill	1,294,675	1,241,429
Other intangible assets, net	808,851	816,573
Other long-term assets	76,536	68,197
Total assets	<u>\$ 4,390,031</u>	<u>\$ 4,259,671</u>
LIABILITIES		
Notes payable and current maturities of long-term debt	\$ 86,335	\$ 14,481
Accounts payable	128,183	128,478
Accrued liabilities	75,052	99,433
Total current liabilities	289,570	242,392
Long-term debt	2,589,713	2,547,717
Deferred income taxes	323,033	318,463
Other long-term liabilities	123,299	123,155
Total liabilities	<u>3,325,615</u>	<u>3,231,727</u>
Commitments and contingencies (Note 16)		
EQUITY		
Common stock, Class B (\$0.01 par); authorized shares 30,000,000; issued shares 6,727,685; outstanding shares 6,711,756 and 6,726,907 on June 30, 2017 and December 31, 2016, respectively	67	67
Common stock, Class A (\$0.01 par); authorized shares 160,500,000; issued shares 627,251; outstanding shares 625,172 and 626,135 on June 30, 2017 and December 31, 2016, respectively	6	6
Additional paid-in capital	1,169,965	1,167,137
Accumulated deficit	(94,443)	(90,380)
Treasury stock, at cost; shares 15,929 (Class B) and 2,079 (Class A) on June 30, 2017 and 778 (Class B) and 1,116 (Class A) on December 31, 2016	(239)	(239)
Accumulated other comprehensive loss	(15,798)	(53,711)
Total PQ Group Holdings Inc. equity	1,059,558	1,022,880
Noncontrolling interest	4,858	5,064
Total equity	<u>1,064,416</u>	<u>1,027,944</u>
Total liabilities and equity	<u>\$ 4,390,031</u>	<u>\$ 4,259,671</u>

See accompanying notes to condensed consolidated financial statements.

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

	Six months ended	
	June 30,	
	2017	2016
Sales	\$ 722,198	\$ 371,467
Cost of goods sold	532,072	283,068
Gross profit	190,126	88,399
Selling, general and administrative expenses	69,738	38,014
Other operating expense, net	27,324	25,588
Operating income	93,064	24,797
Equity in net (income) loss from affiliated companies	(14,622)	4,693
Interest expense	94,961	45,752
Debt extinguishment costs	—	11,858
Other expense, net	16,613	3,024
Income (loss) before income taxes and noncontrolling interest	(3,888)	(40,530)
Provision for income taxes	97	39,549
Net loss	(3,985)	(80,079)
Less: Net (loss) income attributable to the noncontrolling interest	78	314
Net loss attributable to PQ Group Holdings Inc.	<u>\$ (4,063)</u>	<u>\$ (80,393)</u>
Loss per share:		
Basic		
Class B shares	\$ —	\$ —
Class A shares	\$ (9.45)	\$ (186.90)
Diluted		
Class B shares	\$ —	\$ —
Class A shares	\$ (9.45)	\$ (186.90)
Weighted average shares outstanding:		
Basic		
Class B shares	6,679,077	3,224,645
Class A shares	429,985	430,136
Diluted		
Class B shares	6,679,077	3,224,645
Class A shares	429,985	430,136

See accompanying notes to condensed consolidated financial statements.

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

	Six months ended	
	June 30,	
	2017	2016
Net loss	<u>\$ (3,985)</u>	<u>\$ (80,079)</u>
Other comprehensive income (loss), net of tax:		
Pension and postretirement benefits	(203)	324
Net (loss) gain from hedging activities	(3,025)	1,101
Foreign currency translation	41,642	(9,205)
Total other comprehensive income (loss)	<u>38,414</u>	<u>(7,780)</u>
Comprehensive income (loss)	<u>34,429</u>	<u>(87,859)</u>
Less: Comprehensive income (loss) attributable to noncontrolling interest	579	(165)
Comprehensive income (loss) attributable to PQ Group Holdings Inc.	<u>\$ 33,850</u>	<u>\$ (87,694)</u>

See accompanying notes to condensed consolidated financial statements.

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

	Common stock, Class B	Common stock, Class A	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Noncontrolling interest	Total
Balance, December 31, 2016	\$ 67	\$ 6	\$1,167,137	\$ (90,380)	\$ (239)	\$ (53,711)	\$ 5,064	\$1,027,944
Net (loss) income	—	—	—	(4,063)	—	—	78	(3,985)
Other comprehensive income (loss)	—	—	—	—	—	37,913	501	38,414
Dividend distribution	—	—	—	—	—	—	(785)	(785)
Stock compensation expense	—	—	2,828	—	—	—	—	2,828
Balance, June 30, 2017	<u>\$ 67</u>	<u>\$ 6</u>	<u>\$1,169,965</u>	<u>\$ (94,443)</u>	<u>\$ (239)</u>	<u>\$ (15,798)</u>	<u>\$ 4,858</u>	<u>\$1,064,416</u>

	Common stock, Class B	Common stock, Class A	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Noncontrolling interest	Total
Balance, December 31, 2015	\$ —	\$ —	\$ 245,279	\$ (10,634)	\$ —	\$ 648	\$ —	\$ 235,293
Business Combination	67	6	912,127	—	—	—	6,569	918,769
Net (loss) income	—	—	—	(80,393)	—	—	314	(80,079)
Other comprehensive income (loss)	—	—	—	—	—	(7,301)	(479)	(7,780)
Stock repurchase	—	—	(2,540)	—	—	—	—	(2,540)
Equity contribution	—	—	5,100	—	—	—	—	5,100
Dividend distribution	—	—	—	—	—	—	(476)	(476)
Stock compensation expense	—	—	3,778	—	—	—	—	3,778
Balance, June 30, 2016	<u>\$ 67</u>	<u>\$ 6</u>	<u>\$1,163,744</u>	<u>\$ (91,027)</u>	<u>\$ —</u>	<u>\$ (6,653)</u>	<u>\$ 5,928</u>	<u>\$1,072,065</u>

See accompanying notes to condensed consolidated financial statements.

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

	Six months ended June 30,	
	2017	2016
Cash flows from operating activities:		
Net loss	\$ (3,985)	\$ (80,079)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:		
Depreciation	58,030	29,868
Amortization	25,176	12,123
Acquisition accounting valuation adjustments on inventory sold	871	17,714
Amortization of deferred financing costs and original issue discount	4,348	2,356
Debt extinguishment costs	—	7,182
Debt modification creditor fees capitalized	—	(1,932)
Foreign currency exchange loss	16,356	3,090
Pension and postretirement healthcare benefit expense	2,090	1,566
Pension and postretirement healthcare benefit funding	(3,605)	(311)
Deferred income tax expense	(5,270)	26,003
Net loss on asset disposals	2,925	1,661
Supplemental pension plan mark-to-market gain	(499)	(164)
Stock compensation	2,828	3,778
Equity in net (income) loss from affiliated companies	(14,622)	4,693
Dividends received from affiliated companies	15,071	136
Working capital changes that provided (used) cash, excluding the effect of business combinations:		
Receivables	(44,046)	(8,014)
Inventories	2,015	2,836
Prepays and other current assets	(1,440)	648
Accounts payable	(7,408)	(7,869)
Accrued liabilities	(25,812)	(17,197)
Other, net	(1,272)	(2,460)
Net cash provided by (used in) operating activities	<u>21,751</u>	<u>(4,372)</u>
Cash flows from investing activities:		
Purchases of property, plant and equipment	(60,613)	(38,360)
Investment in affiliated companies	(5,000)	—
Change in restricted cash, net	9,376	(7,556)
Loan receivable under the New Market Tax Credit arrangement	(6,221)	(7,823)
Business combinations, net of cash acquired	(41,572)	(1,777,740)
Other, net	474	—
Net cash used in investing activities	<u>(103,556)</u>	<u>(1,831,479)</u>
Cash flows from financing activities:		
Draw down of revolver	250,000	103,000
Repayments of revolver	(185,000)	(75,000)
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	—	1,174,709
Issuance of long-term notes, net of original issue discount and financing fees	—	1,122,079
Debt issuance costs	—	(5,397)
Repayments of long-term debt	(6,216)	(473,001)
Equity contribution	—	5,100
Stock repurchase	—	(2,540)
Distributions to noncontrolling interests	(785)	(476)
Net cash provided by financing activities	<u>66,819</u>	<u>1,859,474</u>
Effect of exchange rate changes on cash and cash equivalents	(5,299)	(1,284)
Net change in cash and cash equivalents	(20,285)	22,339
Cash and cash equivalents at beginning of period	70,742	25,155
Cash and cash equivalents at end of period	<u>\$ 50,457</u>	<u>\$ 47,494</u>
Supplemental cash flow information:		
Cash paid for taxes	\$ 15,904	\$ 5,565
Cash paid for interest	\$ 91,710	\$ 35,055
Non-cash investing activity:		
Capital expenditures acquired on account but unpaid as of the period end	\$ 11,681	\$ 9,414
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)
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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 businesses: 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 Environmental Catalysts & Services: an industry-leading refinery services company that is also 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 and as an integrated silica catalyst and specialty zeolite-based catalyst producer, producing silica catalyst used in the production of high-density polyethylene (“HDPE”) and methyl methacrylate (“MMA”), and specialty zeolite-based catalysts sold to the emissions control industry, the petrochemical industry and other areas of the broader chemicals industry.

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

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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 notes thereto for the year ended December 31, 2016. The Company has continued to follow the accounting policies set forth in those consolidated financial statements.

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. Current GAAP prohibits the recognition of current and deferred income taxes for an intra-entity asset transfer until the asset has been sold to an outside party 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.

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 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

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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 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

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impact that the new guidance will have on its consolidated financial statements. As of June 30, 2017, the Company had \$4,405 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 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 has not yet determined whether the guidance will 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

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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 June 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 June 30, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Derivative contracts	\$ 1,653	\$ —	\$ 1,653	\$ —
Restoration plan assets	<u>5,604</u>	<u>5,604</u>	<u>—</u>	<u>—</u>
Total	<u>\$ 7,257</u>	<u>\$ 5,604</u>	<u>\$ 1,653</u>	<u>\$ —</u>
Liabilities:				
Derivative contracts	<u>\$ 117</u>	<u>\$ —</u>	<u>\$ 117</u>	<u>\$ —</u>

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	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 the Company’s 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 swaps that are 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 June 30, 2017 and December 31, 2016, the credit valuation adjustment resulted in a minimal change in the fair value of the derivatives. See Note 13 to these condensed consolidated financial statements regarding the Company’s use of derivative financial instruments.

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4. Accumulated Other Comprehensive Income (Loss):

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

	Six months ended June 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	\$ (228)	\$ 25	\$ (203)	\$ 324	\$ —	\$ 324
Benefit plans, net	(228)	25	(203)	324	—	324
Net (loss) gain from hedging activities	(4,887)	1,862	(3,025)	1,776	(675)	1,101
Foreign currency translation	47,859	(6,217)	41,642	(6,875)	(2,330)	(9,205)
Other comprehensive income (loss)	<u>\$ 42,744</u>	<u>\$ (4,330)</u>	<u>\$ 38,414</u>	<u>\$ (4,775)</u>	<u>\$ (3,005)</u>	<u>\$ (7,780)</u>

The following table presents the change in accumulated other comprehensive loss, net of tax, by component for the six months ended June 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	(269)	(3,038)	41,141	37,834
Amounts reclassified from accumulated other comprehensive income (a)	66	13	—	79
Net current period other comprehensive income (loss)	(203)	(3,025)	41,141	37,913
June 30, 2017	<u>\$ 7,310</u>	<u>\$ 1,532</u>	<u>\$ (24,640)</u>	<u>\$ (15,798)</u>
December 31, 2015	\$ 648	\$ —	\$ —	\$ 648
Other comprehensive income (loss) before reclassifications	324	650	(8,726)	(7,752)
Amounts reclassified from accumulated other comprehensive income (a)	—	451	—	451
Net current period other comprehensive income (loss)	324	1,101	(8,726)	(7,301)
June 30, 2016	<u>\$ 972</u>	<u>\$ 1,101</u>	<u>\$ (8,726)</u>	<u>\$ (6,653)</u>

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

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The following table presents the reclassifications out of accumulated other comprehensive loss for the six months ended June 30, 2017 and 2016. Amounts in parenthesis indicate debits to profit/loss.

<u>Details about Accumulated Other Comprehensive Income Components</u>	<u>Amount Reclassified from Accumulated Other Comprehensive Income</u>		<u>Affected Line Item in the Statement Where Net Income is Presented</u>
	<u>Six months ended</u>		
	<u>2017</u>	<u>2016</u>	
Defined benefit and other postretirement plans			
Amortization of prior service cost	\$ 40	\$ —	(a)
Amortization of net gain (loss)	37	—	(a)
	77	—	Total before tax
	(11)	—	Tax (expense) benefit
	<u>\$ 66</u>	<u>\$ —</u>	Net of tax
Net gain (loss) from hedging activities			
Interest rate caps	\$ 11	\$ —	Interest expense
Natural gas swaps	10	728	Cost of goods sold
	21	728	Total before tax
	(8)	(277)	Tax (expense) benefit
	<u>\$ 13</u>	<u>\$ 451</u>	Net of tax
Total reclassifications for the period	<u>\$ 79</u>	<u>\$ 451</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.

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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	<u>\$ 41,572</u>
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	<u>1,810</u>
Fair value of assets acquired	33,010
Current debt	(6,420)
Accounts payable	(10,748)
Long-term debt	(10,189)
Other long-term liabilities	<u>(154)</u>
Fair value of net assets acquired	5,499
Goodwill	<u>36,073</u>
	<u>\$ 41,572</u>

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 June 30, 2017. Net sales and operating income attributable to Sovitec during this period are included in the Company's condensed consolidated statement of operations and total \$3,704 and \$679, respectively, for the six months ended June 30, 2017. Acquisition costs of \$1,328 are included in other operating expense, net in the Company's condensed consolidated statement of operations for the six months ended June 30, 2017.

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 its existing business, which 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.

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

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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. Acquisition costs of \$502 are included in other operating expense, net in the Company's consolidated statement of operations for the six months ended June 30, 2016.

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 \$53,866 higher than the historical cost. The Company's cost of goods sold includes a pre-tax charge of \$17,714 for the six months ended June 30, 2016 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 six months ended June 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.

	Six months ended June 30, 2016 (unaudited)
Pro forma sales	\$ 710,331
Pro forma net loss	(46,379)

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Certain non-recurring charges included in the Company's results of operations for the six months ended June 30, 2016 were allocated to the respective prior year periods for pro forma purposes. For the six months ended June 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 six months ended June 30, 2016.

7. Goodwill

The changes in the carrying amount of goodwill for the six months ended June 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	36,073	—	36,073
Foreign exchange impact	15,808	1,365	17,173
Balance as of June 30, 2017	<u>904,387</u>	<u>390,288</u>	<u>1,294,675</u>

8. Other Operating Expense, Net:

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

	Six months ended June 30,	
	2017	2016
Restructuring and other related costs (Note 18)	\$ 1,472	\$ 9,584
Amortization expense	14,124	7,992
Net loss on asset disposals	2,925	1,661
Transaction and other related costs ⁽¹⁾	4,329	4,451
Management advisory fees	2,500	1,083
Other, net	1,974	817
	<u>\$27,324</u>	<u>\$25,588</u>

(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.

9. Inventories:

Inventories are classified and valued as follows:

	June 30, 2017	December 31, 2016
Finished products and work in process	\$ 180,089	\$ 175,182
Raw materials	56,419	51,866
	<u>\$ 236,508</u>	<u>\$ 227,048</u>

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	<u>June 30,</u> <u>2017</u>	<u>December 31,</u> <u>2016</u>
Valued at lower of cost or market:		
LIFO basis	\$ 143,350	\$ 135,605
FIFO or average cost basis	93,158	91,443
	<u>\$ 236,508</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 June 30, 2017 are as follows:

<u>Company</u>	<u>Country</u>	<u>Percent</u> <u>Ownership</u>
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:

	<u>Six months ended</u> <u>June 30,</u>	
	<u>2017</u>	<u>2016</u>
Net sales	\$ 141,787	\$ 44,787
Gross profit	58,586	22,306
Operating income	37,695	15,654
Net income	39,844	15,643

The Company's investments in affiliated companies balance as of June 30, 2017 and December 31, 2016 includes net purchase accounting fair value adjustments of \$267,117 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 \$5,283 of amortization expense related to purchase accounting fair value adjustments for the six months ended June 30, 2017 and \$12,316 for the six months ended June 30, 2016.

11. Property, Plant and Equipment:

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

	<u>June 30,</u> <u>2017</u>	<u>December 31,</u> <u>2016</u>
Land	\$ 190,638	\$ 186,327
Buildings	179,270	157,944
Machinery and equipment	905,811	788,175
Construction in progress	179,815	204,138
	<u>1,455,534</u>	<u>1,336,584</u>
Less: accumulated depreciation	<u>(251,609)</u>	<u>(155,196)</u>
	<u>\$ 1,203,925</u>	<u>\$ 1,181,388</u>

Depreciation expense was \$58,030 and \$29,868 for the six months ended June 30, 2017 and 2016, respectively.

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12. Long-term Debt:

The summary of long-term debt is as follows:

	June 30, 2017	December 31, 2016
Senior secured USD term loans with interest at 5.25% (due May 2022)	\$ 920,792	\$ 925,430
Senior secured Euro term loans with interest at 5.00% (due May 2022)	321,752	297,317
Senior secured notes with interest at 6.75% (due November 2022)	625,000	625,000
Senior unsecured notes with interest at 11.75% (due May 2022)	525,000	525,000
Senior unsecured notes with interest at 8.50% (due November 2022)	200,000	200,000
ABL revolving credit facility (due May 2021)	65,000	—
Other	70,944	45,223
Total debt	2,728,488	2,617,970
Original issue discount	(26,447)	(28,497)
Deferred financing costs	(25,993)	(27,275)
Total debt, net of original issue discount and deferred financing costs	2,676,048	2,562,198
Less: current portion	(86,335)	(14,481)
Total long-term debt	<u>\$ 2,589,713</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 June 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 \$67,738 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 June 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. and several of its affiliates ("USB") and Business Conduit No. 28, LLC, an affiliate of Community Reinvestment Fund, Inc. ("CRF") whereby USB agreed to contribute \$3,054 and an additional \$6,221 in funds lent to USB by Potters Leveraged Lender LLC to USB. CRF, in turn, lent \$8,820 in the form of \$6,221 and \$2,599 of notes to Potters, which used the proceeds to acquire equipment for the expansion of Potters' manufacturing facility in Paris, Texas (the "June 2017 NMTC Agreement"). The June 2017 NMTC Agreement provides the Company with certain monetary benefits as an offset to specifically identified capital expenditures. The June 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 June 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

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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.

13. Financial Instruments:

The Company uses interest rate derivative instruments to manage its exposure 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 950,000 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 the Company's interest payments over the term of the loans. Likewise, an increase in interest rates could have a material impact on the Company's cash flow. The Company hedges the interest rate fluctuations on its variable-rate 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

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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 June 30, 2017 and December 31, 2016 are shown below:

	Balance sheet location	June 30, 2017	December 31, 2016
Asset derivatives:			
Derivatives designated as cash flow hedges:			
Natural gas swaps	Current assets	\$ —	\$ 573
Natural gas swaps	Other long-term assets	—	58
Interest rate caps	Other long-term assets	1,653	5,803
Total asset derivatives		<u>\$ 1,653</u>	<u>\$ 6,434</u>
Liability derivatives:			
Derivatives designated as cash flow hedges:			
Natural gas swaps	Accrued liabilities	\$ 111	\$ —
Natural gas swaps	Other long-term liabilities	6	—
Total liability derivatives		<u>\$ 117</u>	<u>\$ —</u>

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 six months ended June 30, 2017 and 2016:

		Six months ended June 30,			
		2017		2016	
		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)
Derivatives designated as cash flow hedges:	Location in Earnings				
Interest rate caps	Interest expense	\$ (4,150)	\$ 11	\$ —	\$ —
Natural gas swaps	Cost of goods sold	(759)	10	(1,420)	728
		<u>\$ (4,909)</u>	<u>\$ 21</u>	<u>\$ (1,420)</u>	<u>\$ 728</u>

Amounts of unrealized losses in OCI that are expected to be reclassified to the consolidated statement of operations over the next twelve months are \$233 as of June 30, 2017.

14. Income Taxes:

The effective income tax rate for the six month period ended June 30, 2017 was (2.5%) compared to (97.6%) for the six month period ended June 30, 2016. The Company's effective income tax rate fluctuates based primarily on changes in income mix, repatriation of income from foreign subsidiaries and, for the comparative periods, the change in Eco Services' tax status.

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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 their 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 six months ended June 30, 2016, causing the fluctuation to the Company's effective income tax rate in comparison to the taxes recorded for the six months ended June 30, 2017.

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 repatriating foreign earnings back to the United States as dividends offset by lower tax rates in foreign jurisdictions as compared to the U.S. tax rate, foreign withholding taxes, state taxes and non-deductible transaction costs.

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	
	Six months ended		Six months ended	
	June 30,		June 30,	
	2017	2016	2017	2016
Service cost	\$ 609	\$ 1,093	\$ 1,783	\$ 542
Interest cost	5,072	2,715	2,685	566
Expected return on plan assets	(6,122)	(3,072)	(2,217)	(511)
Net periodic expense (benefit)	<u>\$ (441)</u>	<u>\$ 736</u>	<u>\$ 2,251</u>	<u>\$ 597</u>

Supplemental Retirement Plans

	Six months ended	
	June 30,	
	2017	2016
Interest cost	\$ 246	\$ 81
Net periodic expense	<u>\$ 246</u>	<u>\$ 81</u>

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Other Postretirement Benefit Plans

	Six months ended June 30,	
	2017	2016
Service cost	\$ 10	\$ 19
Interest cost	81	56
Amortization of prior service credit	(39)	—
Amortization of net gain	(38)	—
Net periodic expense	\$ 14	\$ 75

	Six months ended June 30,	
	2017	2016
Contributions		
Pension Benefits - Foreign	\$ 2,865	\$ 198
Supplemental Retirement Plans	102	17
Other Postretirement Benefit Plans	638	96

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 will 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 June 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$605 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

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("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 has 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 June 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$527 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. In January 2017, a hearing to review the merits of PQ's appeal to the Environmental Hearing Board was held, followed by a 90 to 120 day briefing period after which the judge should render an opinion. As of June 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$1,500 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 June 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$561 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 some, but not all, of the alleged contamination. As of June 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$867 and \$913, respectively, for costs related to this potential liability.

The Company has recorded a reserve of \$1,503 and \$1,776 as of June 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

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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 RWQCP 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 RWQCP 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 June 30, 2017 and December 31, 2016, the Company has recorded a reserve of \$1,558 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.

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17. Reportable Segments:

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

	Six months ended June 30,	
	2017	2016
Net sales:		
Performance Materials & Chemicals	\$ 488,709	\$ 173,648
Environmental Catalysts & Services ⁽¹⁾	235,273	198,219
Eliminations ⁽²⁾	(1,784)	(400)
Total	<u>\$ 722,198</u>	<u>\$ 371,467</u>
	Six months ended June 30,	
	2017	2016
Segment Adjusted EBITDA ⁽³⁾		
Performance Materials & Chemicals	\$ 118,856	\$ 46,574
Environmental Catalysts & Services ⁽⁴⁾	120,678	78,703
Total Segment Adjusted EBITDA ⁽⁵⁾	<u>\$ 239,534</u>	<u>\$ 125,277</u>

(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 \$63,369 and \$20,276 for the six months ended June 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 performance. Adjusted EBITDA as defined by the Company may not be comparable with EBITDA or Adjusted EBITDA as defined by other companies.

(4) The equity in net income included in the Environmental Catalysts & Services segment is \$19,782 and \$7,585 for the six months ended June 30, 2017 and 2016, respectively.

(5) Total Segment Adjusted EBITDA differs from the Company's consolidated Adjusted EBITDA due to unallocated corporate expenses.

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

	Six months ended	
	June 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.	\$ (4,063)	\$ (80,393)
Provision for income taxes	97	39,549
Interest expense, net	94,961	45,752
Depreciation and amortization	83,206	41,991
Segment EBITDA	174,201	46,899
Unallocated corporate expenses	15,589	6,624
Joint venture depreciation, amortization, and interest	5,510	1,844
Amortization of investment in affiliate step-up	5,282	12,315
Amortization of inventory step-up	871	17,714
Debt extinguishment costs	—	11,858
Losses on disposal of fixed assets	2,925	1,661
Foreign currency exchange losses	16,356	3,090
Non-cash revaluation of inventory, including LIFO	2,479	446
Management advisory fees	\$ 2,500	\$ 1,083
Transaction and other related costs	4,334	4,544
Equity-based and other non-cash compensation	2,828	3,779
Restructuring, integration and business optimization expenses	3,052	11,728
Defined benefit pension plan cost	1,409	1,398
Other	2,198	294
Segment Adjusted EBITDA	\$ 239,534	\$ 125,277

18. Restructuring and Other Related Costs:

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

	Six months ended	
	June 30,	
	2017	2016
Severance and other employee costs related to restructuring plan	\$ 830	\$4,496
Other related costs	642	5,088
	<u>\$1,472</u>	<u>\$9,584</u>

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

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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 primarily 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 six months ended June 30, 2017 and 2016, respectively.

The activity in the accrued liability balance associated with the restructuring plan, all of which related to severance and other employee costs, was as follows for the six months ended June 30, 2017:

Balance at December 31, 2016	\$ 1,643
Restructuring charges	830
Cash payments	<u>(1,527)</u>
Balance at June 30, 2017	<u>\$ 946</u>

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

Other Related Costs

The Company incurred severance and other business optimization costs of \$642 and \$5,088 for the six months ended June 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. In periods of income, the income is shared equally amongst Class A and B common stockholders. In the event of liquidation, the holders of Class B common stock have preference to receiving distributions before the holders of Class A common stock. As a result, holders of Class B common stock are considered preferential participating securities and will not be allocated any losses in the periods of net losses, but will be allocated income in the periods of net income using the two-class method.

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. Potential shares reflect unvested Class A and Class B restricted stock as well as options to purchase Class A shares (subsequent to the Business Combination) and Eco Services membership units (prior to the Business Combination), which have been included in the diluted earnings per share calculation using the treasury stock method. Note that for the six month periods ended June 30, 2017 and 2016, potential common shares only include those with service vesting conditions, as the performance vesting conditions associated with certain of the Company's restricted stock and stock options were not met as of the respective reporting dates. For purposes of calculating diluted earnings per share, income has been reallocated between the classes based on the diluted weighted average number of common shares outstanding for each class. In periods of net loss, inclusion of potential common shares would be antidilutive.

For both the basic and dilutive weighted average shares calculations, as a result of the Business Combination, the number of Eco Services membership units outstanding for the six months ended June 30, 2016 were computed on the basis of the weighted average units outstanding for Eco Services during the period multiplied by the exchange ratio established for Class B shares as part of the Business Combination. For the periods preceding the Business Combination during the six months ended June 30, 2016, units of Eco Services

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were retrospectively reflected as Class B shares for earnings per share purposes, since during the periods preceding the Business Combination, this was the only class of shares in existence to absorb income and losses.

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

	Six months ended June 30,	
	2017	2016
Weighted average shares outstanding – Basic - Class B:	6,679,077	3,224,645
Dilutive effect of unvested Class B shares with service conditions and assumed stock option exercises and conversions	—	—
Weighted average shares outstanding – Diluted - Class B:	<u>6,679,077</u>	<u>3,224,645</u>
Weighted average shares outstanding – Basic - Class A:	429,985	430,136
Dilutive effect of assumed stock option exercises and conversions	—	—
Weighted average shares outstanding – Diluted - Class A:	<u>429,985</u>	<u>430,136</u>

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

	Six months ended June 30,	
	2017	2016
Numerator:		
Net loss attributable to PQ Group Holdings Inc.	\$ (4,063)	\$ (80,393)
Denominator:		
Weighted average shares outstanding – Basic:		
Class B shares	6,679,077	3,224,645
Class A shares	429,985	430,136
Total weighted average shares outstanding – Basic	<u>7,109,062</u>	<u>3,654,781</u>
Weighted average shares outstanding – Diluted:		
Class B shares	6,679,077	3,224,645
Class A shares	429,985	430,136
Total weighted average shares outstanding – Diluted	<u>7,109,062</u>	<u>3,654,781</u>
Basic net loss per share:		
Class B shares	\$ —	\$ —
Class A shares	\$ (9.45)	\$ (186.90)
Diluted net loss per share:		
Class B shares	\$ —	\$ —
Class A shares	\$ (9.45)	\$ (186.90)

20. Subsequent Events:

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 new term loans have substantially identical terms to the existing term loans, except that borrowings under the new 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%.

The Company has evaluated subsequent events since the balance sheet date through August 9, 2017, the date the financial statements were available to be issued, and determined there are no additional items to disclose.

Report of Independent Auditors

To the Board of Directors
PQ Holdings Inc. and Subsidiaries:

We have audited the accompanying consolidated financial statements of PQ Holdings Inc. and its subsidiaries, which comprise the consolidated balance sheets as of December 31, 2015 and 2014, and the related consolidated statements of operations, comprehensive income (loss), stockholders' equity and cash flows for the three years in the period ended December 31, 2015.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the consolidated financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the Company's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of PQ Holdings Inc. and its subsidiaries as of December 31, 2015 and 2014, and the results of their operations and their cash flows for the three years in the period ended December 31, 2015 in accordance with accounting principles generally accepted in the United States of America.

Emphasis of Matter

As discussed in Note 3 to the consolidated financial statements, the Company changed the manner in which it classifies deferred taxes in 2015 due to the adoption of Accounting Standards Update 2015-17, Balance Sheet Classification of Deferred Taxes and in which it classifies deferred finance costs in 2015 due to the adoption of Accounting Standards Update 2015-03, Simplifying the Presentation of Debt Issuance Costs. Our opinion is not modified with respect to this matter.

/s/ PricewaterhouseCoopers LLP
Philadelphia, Pennsylvania
March 5, 2016

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PQ HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(in thousands)

	December 31, 2015	December 31, 2014
ASSETS		
Cash and cash equivalents	\$ 53,507	\$ 100,836
Receivables, net	117,438	122,577
Inventories	197,093	189,286
Prepaid and other current assets	19,006	18,733
Total current assets	387,044	431,432
Investments in affiliated companies	224,480	202,745
Property, plant and equipment, net	569,168	546,716
Goodwill	717,460	721,341
Tradenames	104,415	108,972
Other intangible assets, net	219,617	251,403
Other long-term assets	45,900	47,653
Total assets	<u>\$ 2,268,084</u>	<u>\$ 2,310,262</u>
LIABILITIES		
Notes payable and current maturities of long-term debt	\$ 14,508	\$ 14,534
Accounts payable	104,645	102,717
Accrued liabilities	73,497	78,098
Total current liabilities	192,650	195,349
Long-term debt	1,789,255	1,792,870
Deferred income taxes	113,197	114,485
Other long-term liabilities	96,865	110,010
Total liabilities	<u>2,191,967</u>	<u>2,212,714</u>
Commitments and contingencies (Note 20)		
EQUITY		
Common stock, Class A (\$0.01 par); authorized shares 150,000,000; issued shares 680,678; outstanding shares 582,280 and 582,593 on December 31, 2015 and December 31, 2014, respectively	6	6
Common stock, Class B (\$0.01 par); authorized shares 30,000,000; issued shares 5,100,795; outstanding shares 5,087,995 on December 31, 2015 and December 31, 2014, respectively	51	51
Common stock, Class C (\$0.01 par); authorized shares 10,000,000; issued shares 48,820; outstanding shares 48,820 on December 31, 2015 and December 31, 2014, respectively	—	—
Common stock, Class D (\$0.01 par); authorized shares 1,500,000; issued shares 84,258 and 5,800; outstanding shares 84,258 and 5,800 on December 31, 2015 and December 31, 2014, respectively	1	—
Additional paid-in capital	466,476	459,819
Accumulated deficit	(264,013)	(271,864)
Treasury stock, at cost; shares 98,398 and 98,085 (Class A), 12,800 (Class B), 0 (Class C), 0 (Class D) on December 31, 2015 and December 31, 2014, respectively	(916)	(916)
Accumulated other comprehensive loss	(131,973)	(96,637)
Total PQ Holdings Inc. equity	69,632	90,459
Noncontrolling interest	6,485	7,089
Total equity	<u>76,117</u>	<u>97,548</u>
Total liabilities and equity	<u>\$ 2,268,084</u>	<u>\$ 2,310,262</u>

See accompanying notes to consolidated financial statements.

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PQ HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands)

	Twelve months ended		
	December 31,		
	2015	2014	2013
Sales	\$ 1,024,326	\$ 1,114,904	\$ 1,085,019
Cost of goods sold	748,756	818,483	795,416
Gross profit	275,570	296,421	289,603
Selling, general and administrative expenses	107,097	110,886	111,229
Other operating expense, net	51,516	71,148	49,373
Operating income	116,957	114,387	129,001
Equity in net income from affiliated companies	45,325	29,359	53,808
Interest expense	108,375	111,553	120,347
Debt extinguishment costs	—	2,476	20,287
Other expense, net	21,383	23,886	3,316
Income before income taxes and noncontrolling interest	32,524	5,831	38,859
Provision for income taxes	22,902	7,548	10,608
Net income (loss)	9,622	(1,717)	28,251
Less: Net income attributable to the noncontrolling interest	1,771	1,894	1,521
Net income (loss) attributable to PQ Holdings Inc.	<u>\$ 7,851</u>	<u>\$ (3,611)</u>	<u>\$ 26,730</u>

See accompanying notes to consolidated financial statements.

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

	Twelve months ended		
	December 31,		
	<u>2015</u>	<u>2014</u>	<u>2013</u>
Net income (loss)	\$ 9,622	\$ (1,717)	\$ 28,251
Other comprehensive (loss) income, net of tax:			
Pension and postretirement benefits	1,776	(18,411)	17,265
Net gain (loss) from hedging activities	257	(2,426)	1,700
Foreign currency translation	(38,415)	(24,883)	(17,774)
Total other comprehensive (loss) income	<u>(36,382)</u>	<u>(45,720)</u>	<u>1,191</u>
Comprehensive (loss) income	(26,760)	(47,437)	29,442
Less: Comprehensive income attributable to non-controlling interests	725	1,056	1,620
Comprehensive (loss) income attributable to PQ Holdings Inc.	<u><u>\$ (27,485)</u></u>	<u><u>\$ (48,493)</u></u>	<u><u>\$ 27,822</u></u>

See accompanying notes to consolidated financial statements.

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

	Common stock, Class A	Common stock, Class B	Common stock, Class C	Common stock, Class D	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Noncontrolling interest	Total
Balance, December 31, 2012	\$ 7	\$ 51	\$ —	\$ —	\$ 458,807	\$ (294,983)	\$ (731)	\$ (52,847)	\$ 7,059	\$117,363
Net income	—	—	—	—	—	26,730	—	—	7,059	28,251
Other comprehensive income	—	—	—	—	—	—	—	1,092	99	1,191
Stock repurchase	(1)	—	—	—	1	—	(185)	—	—	(185)
Dividend distribution	—	—	—	—	—	—	—	—	(745)	(745)
Stock compensation for restricted stock awards	—	—	—	—	1,011	—	—	—	—	1,011
Balance, December 31, 2013	\$ 6	\$ 51	\$ —	\$ —	\$ 459,819	\$ (268,253)	\$ (916)	\$ (51,755)	\$ 7,934	\$146,886
Net income	—	—	—	—	—	(3,611)	—	—	1,894	(1,717)
Other comprehensive loss	—	—	—	—	—	—	—	(44,882)	(838)	(45,720)
Dividend distribution	—	—	—	—	—	—	—	—	(1,901)	(1,901)
Stock compensation for restricted stock awards	—	—	—	—	—	—	—	—	—	—
Balance, December 31, 2014	\$ 6	\$ 51	\$ —	\$ —	\$ 459,819	\$ (271,864)	\$ (916)	\$ (96,637)	\$ 7,089	\$ 97,548
Net income	—	—	—	—	—	7,851	—	—	1,771	9,622
Other comprehensive loss	—	—	—	—	—	—	—	(35,336)	(1,046)	(36,382)
Equity contribution	—	—	—	1	3,299	—	—	—	—	3,300
Dividend distribution	—	—	—	—	—	—	—	—	(1,329)	(1,329)
Stock compensation for restricted stock awards	—	—	—	—	3,358	—	—	—	—	3,358
Balance, December 31, 2015	\$ 6	\$ 51	\$ —	\$ 1	\$ 466,476	\$ (264,013)	\$ (916)	\$ (131,973)	\$ 6,485	\$ 76,117

See accompanying notes to consolidated financial statements.

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

	Twelve months ended December 31,		
	2015	2014	2013
Cash flows from operating activities:			
Net income (loss)	\$ 9,622	\$ (1,717)	\$ 28,251
Adjustments to reconcile net income to net cash used in operating activities:			
Depreciation	62,586	59,904	57,089
Amortization	30,536	31,438	32,217
Impairment of long-lived assets	425	—	948
Amortization of deferred financing costs and original issue discount	8,735	8,899	9,427
Hedge premium amortization	398	1,434	1,778
Debt extinguishment costs	—	2,476	20,287
Foreign currency exchange loss	21,059	23,387	4,414
Pension and postretirement healthcare benefit expense	3,631	1,672	3,281
Pension and postretirement healthcare benefit funding	(4,607)	(6,957)	(6,877)
Deferred income tax provision (benefit)	7,664	(10,478)	(6,644)
Net loss on asset disposals	1,548	694	653
Supplemental pension plan mark-to-market loss (gain)	231	(798)	(930)
Stock compensation	3,358	—	1,011
Equity in net income from affiliated companies, net	(45,325)	(29,359)	(53,808)
Dividends received from affiliated companies	30,089	34,255	33,050
Working capital changes that (used) provided cash:			
Receivables	(4,946)	(1,816)	1,995
Inventories	(17,535)	(2,283)	(16,710)
Prepays and other current assets	(2,663)	(2,743)	983
Accounts payable	3,252	5,164	6,732
Accrued liabilities	(8,440)	7,639	(344)
Other, net	(722)	(401)	(905)
Net cash provided by operating activities	<u>98,896</u>	<u>120,410</u>	<u>115,898</u>
Cash flows from investing activities:			
Purchases of property, plant and equipment	(103,118)	(120,932)	(73,221)
Investment in affiliated companies	(10,000)	(10,000)	(18,000)
Change in restricted cash, net	—	16,890	(16,890)
Business acquisitions, net of cash acquired	(12,000)	—	—
Loan receivable under the New Market Tax Credit arrangement	—	—	(15,632)
Other, net	(26)	10	(1,615)
Net cash used in investing activities	<u>(125,144)</u>	<u>(114,032)</u>	<u>(125,358)</u>
Cash flows from financing activities:			
Draw down of revolver	68,000	—	—
Repayments of revolver	(68,000)	—	—
Issuance of long-term debt under the New Market Tax Credit arrangement	—	—	20,175
Issuance of long-term debt, net of original issue discount	—	1,222,114	1,222,800
Debt issuance costs	—	—	(1,771)
Repayments of long-term debt	(12,350)	(1,235,000)	(1,232,350)
Interest hedge premium	—	—	(995)
Equity contribution	3,300	—	—
Stock repurchase	—	—	(185)
Distributions to noncontrolling interests	(1,329)	(1,901)	(745)
Net cash (used in) provided by financing activities	<u>(10,379)</u>	<u>(14,787)</u>	<u>6,929</u>
Effect of exchange rate changes on cash	<u>(10,702)</u>	<u>(8,504)</u>	<u>(4,171)</u>
Net change in cash and cash equivalents	(47,329)	(16,913)	(6,702)
Cash and cash equivalents at beginning of period	100,836	117,749	124,451
Cash and cash equivalents at end of period	<u>\$ 53,507</u>	<u>\$ 100,836</u>	<u>\$ 117,749</u>
Non-cash investing activity:			
Capital expenditures acquired on account but unpaid as of the period end	21,897	15,042	16,820

See accompanying notes to consolidated financial statements.

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

1. Background and Basis of Presentation:

PQ Holdings Inc. and subsidiaries (the “Company”) conducts operations through three principal businesses: Performance 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; Catalysts: an integrated silica catalyst and specialty zeolite-based catalyst producer with leading global market positions, producing silica catalyst used in the production of high-density polyethylene (“HDPE”), and specialty zeolite-based catalysts sold to the emissions control industry, the petrochemical industry and other areas of the broader chemicals industry; and Specialty Glass Materials: a leading global producer of engineered glass products for use in highway safety, polymer additives, metal finishing and electronics end markets, which is comprised of Highway Safety and Engineered Glass Materials (“EGM”). Highway Safety manufactures glass beads used for airport, highway and road safety applications to improve visibility in wet and nighttime driving conditions, where EGM produces solid and hollow glass spheres for use as polymer additives and fillers in specialized plastics, as engineered peening beads in metal finishing and as conductives in consumer electronics and other applications.

We experience some seasonality, primarily with respect to the Specialty Glass Materials business. As the road striping season occurs during warmer weather, sales and earnings are generated primarily during the second and third quarters. Working capital is built during the first half of the year, while cash generation occurs primarily in the second half of the fiscal year.

On May 31, 2007, PQ Corporation and its parent company, Niagara Holdings, Inc., entered into an Agreement and Plan of Merger with affiliates of The Carlyle Group (“2007 Sponsor”), including CPQ Holdings LLC (“CPQ Holdings”), and an affiliate of the previous owner of the Company, J.P. Morgan Partners, pursuant to which PQ Corporation continued as the surviving corporation and an indirect, wholly-owned subsidiary of CPQ Holding Corporation, which was a direct, wholly-owned subsidiary of CPQ Holdings (the “2007 Merger”). The 2007 Merger was consummated on July 30, 2007.

On July 2, 2008, the Company acquired certain assets and liabilities from and certain stock of the entities that comprised INEOS Silicas, a division of INEOS Group that was a global manufacturer of inorganic chemicals based on silica and alumina technology, from INEOS Capital Partners, formerly named INEOS Investments Partnership (“INEOS”) in exchange for cash and shares of CPQ Holding Corporation (the “2008 INEOS Silicas Acquisition”). After the closing of the 2008 INEOS Silicas Acquisition, INEOS Silicas was incorporated into the Performance Chemicals and Catalyst divisions of the Company. Since July 2, 2008, the financial statements include the results of operations of the acquired business.

On January 29, 2014, CPQ Holding Corporation changed its name to PQ Holdings Inc. (“Holdings”).

On September 11, 2014, Holdings entered into a stock purchase agreement (as amended on November 18, 2014) pursuant to which certain investment funds affiliated with CCMP Capital Advisors, LLC (now known as CCMP Capital Advisors, LP; “CCMP” or “2014 Sponsor”) and INEOS, one of the existing stockholders of Holdings, acquired stock of Holdings from CPQ Holdings and certain other selling stockholders (the “2014 Stock Purchase”). The 2014 Stock Purchase was consummated on December 29, 2014. Following consummation of the sale, The Carlyle Group no longer holds any shares of Holdings. The 2014 Stock Purchase did not qualify as a business combination.

On August 18, 2015, the Company announced that Eco Services Holdings LLC (“Eco Services”), the Company and certain of their respective affiliates had signed a definitive agreement (the “*Business Combination*”).

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

Agreement) pursuant to which the Company and Eco Services will reorganize under a newly formed holding company (the “*Combined Company*”). The Combined Company will retain the PQ Corporation name. The Company’s existing indirect shareholders (affiliates of CCMP, affiliates of INEOS Capital Partners and management) and Eco Services’ existing indirect equity holders (affiliates of CCMP and management) will constitute the sole shareholders of the Combined Company immediately following the closing of the business combination. The completion of the transactions is subject to certain closing conditions that are customary for transactions of this type, including regulatory clearance.

2. Summary of Significant Accounting Policies:

Principles of Consolidation. The consolidated financial statements include the accounts of the Company and its controlled subsidiaries. Investments in affiliated companies are recorded at cost plus the Company’s equity in their undistributed earnings. All intercompany transactions have been eliminated.

All assets and liabilities of foreign subsidiaries and affiliated companies are translated to U.S. dollars using exchange rates in effect at the balance sheet date. Adjustments resulting from translation of the balance sheets and intercompany loans, which are considered permanent, are included in stockholders’ equity as part of accumulated other comprehensive loss. Adjustments resulting from translation of certain intercompany loans, which are not considered permanent and are denominated in foreign currencies, are included in other expense (income), net in the consolidated statement of operations. Income and expense items are translated at average exchange rates during the year. Net foreign exchange included in other expense, net was a loss of \$21,059, \$23,387, and \$4,414 for the years ended December 31, 2015, 2014, and 2013, respectively. The foreign currency losses realized in 2015, 2014, and 2013, were primarily driven by the non-permanent intercompany debt denominated in local currency translated to U.S. dollars.

Cash and Cash Equivalents. Cash and cash equivalents include investments with original terms to maturity of 90 days or less from the time of purchase.

Restricted Cash. Restricted cash, which is restricted as to withdrawal or usage, is classified separately from cash and cash equivalents on our consolidated balance sheet. The proceeds from the New Markets Tax Credit (“NMTC”) financing arrangement are restricted for use and are classified on our consolidated balance sheet as a noncurrent asset. As of December 31, 2013, there remained \$16,890 restricted cash that is required to be used to fund the capital expenditure associated with the NMTC agreement and is recorded in other long-term assets on the consolidated balance sheet. During 2014, the balance was fully used to fund the capital expenditure associated with the NMTC agreement. See Note 13 to these consolidated financial statements for further information.

Accounts Receivable and Allowance for Doubtful Accounts. Trade accounts receivable are recorded at the invoiced amount and do not bear interest. The allowance for doubtful accounts is the Company’s best estimate of the amount of probable credit losses in its existing accounts receivable. A specific reserve for bad debt is recorded for known or suspected doubtful accounts receivable. For all other accounts, the Company recognizes a reserve for bad debt based on the length of time receivables are past due and historical write-off experience. Account balances are charged off against the allowance when the Company believes it is probable the receivable will not be recovered. If the financial condition of the Company’s customers were to deteriorate, resulting in an impairment of their ability to make payments, additional allowances would be required. The Company does not have any off-balance sheet credit exposure related to its customers.

Inventories. All inventories are stated at the lower of cost or market. All domestic inventories are valued on the last-in, first-out (“LIFO”) method, and all other inventories are valued on the average cost and first-in,

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first-out (“FIFO”) methods. When necessary, the Company provides allowances to adjust the carrying value of its inventory to the lower of cost or net realizable value, including any costs to sell or dispose. Appropriate consideration is given to obsolescence, excessive inventory levels, product deterioration and other factors in evaluating net realizable value.

Prepaid and Other Current Assets. Prepaid and other current assets primarily include prepayments on insurance and property tax, current deposits, income tax receivables, current deferred tax assets, value-added taxes, receivables from affiliates and other current assets.

Property, Plant, and Equipment. Property, plant and equipment are carried at cost and include expenditures for new facilities and major renewals and betterments. The Company capitalizes the cost of furnace rebuilds as part of property, plant and equipment. Plant and equipment under capital leases are carried at the present value of minimum lease payments. Maintenance, repairs and minor renewals are charged to expense as incurred. The Company capitalizes internal costs associated with the implementation of purchased software. When property, plant and equipment is retired or otherwise disposed of, the net carrying amount is eliminated with any gain or loss on disposition recognized in earnings at that time.

Depreciation is generally provided on the straight-line method based on estimated useful lives of the assets, ranging up to thirty-three years for buildings, ten to twelve years for machinery and equipment, and three to seven years for computer hardware and software.

Investments. Investments are accounted for using the equity method of accounting if the investment provides us the ability to exercise significant influence, but not control, over the investee. Significant influence is generally deemed to exist if the Company’s ownership interest in the voting stock of the investee ranges between 20% and 50%, although other factors, such as representation on the investee’s board of directors and the impact of commercial arrangements, are considered in determining whether the equity method of accounting is appropriate. Under the equity method of accounting, the investments in equity-method investees are recorded in the consolidated balance sheets as investments in affiliated companies and the investees’ earnings or losses together with other-than temporary impairments in value is recorded as equity in net income from affiliated companies in the consolidated statements of operations.

Goodwill and Intangible Assets. Definite-lived intangible assets are amortized over their estimated useful life. Goodwill and intangible assets with indefinite lives are not amortized, but are tested for impairment annually or more frequently if events occur or circumstances change that would more likely than not reduce the fair value of the reporting unit below its carrying amount. A write-down occurs in periods in which it is determined that a reporting unit’s fair value is less than its book value.

Generally accepted accounting principles require the Company to perform an impairment test at least annually. When evaluating goodwill for impairment, the Company can perform a qualitative step zero assessment. If the Company elects to skip or fails the qualitative assessment, then a quantitative assessment on the reporting units is performed. Under a qualitative assessment, the Company will consider the relevant events and circumstances and the extent to which they could affect the comparison of a reporting unit’s fair value to its carrying amount and form a conclusion indicating whether it is more likely than not that the reporting unit’s fair value is less than its carrying amount. The quantitative assessment is a two-step test. In step one the estimated fair value of the reporting unit is compared to its carrying value. If the estimated fair value is less than the carrying value, then step two is required. In step two the actual amount of the goodwill impairment is calculated by comparing the implied fair value of the reporting unit’s goodwill with the carrying amount of that goodwill. The implied fair value is determined in the same manner as the amount of goodwill recognized in a business

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combination. See Note 11 to these consolidated financial statements for further discussion on goodwill impairment.

Other Long-term Assets. Other long-term assets primarily include pension benefits, deferred tax assets, and spare parts.

Valuation of Long-Lived Assets. The Company performs an impairment review of property, plant, and equipment and definite-lived intangible assets when facts and circumstances indicate the carrying value may not be recoverable from its undiscounted cash flows. When evaluating long-lived assets for impairment, if the carrying amount of an asset or asset group is found not to be recoverable, then an impairment loss is recognized. Any impairment loss is measured by comparing the carrying amount of the asset to its fair value. Fair value is determined using quoted market prices where available, or other techniques including discounted cash flows. The Company's estimates of future cash flows involve assumptions concerning future operating performance, economic conditions, and technological changes that may affect the future useful lives of the assets.

Derivative Financial Instruments. The Company utilizes certain derivative financial instruments to enhance its ability to manage risk, including exposures to interest rates and natural gas price fluctuations that exist as part of ongoing business operations. Derivative instruments are entered into for periods consistent with the related underlying exposures and do not constitute positions independent of those exposures.

All derivatives designated as hedges are recognized on the balance sheet at fair value. On the date a derivative contract is entered into, the Company may designate the derivative as a hedge of a forecasted transaction or the variability of cash flows to be received or paid related to a recognized asset or liability (cash flow hedge). Changes in the fair value of a derivative that is highly effective and that is designated and qualifies as a cash-flow hedge are recorded in other comprehensive income (loss) to the extent that the derivative is effective as a hedge, until earnings are affected by the variability in cash flows of the designated hedged item, and the ineffective portion is reported in earnings. Changes in the fair value of a derivative that is not designated or does not qualify as a cash flow hedge are recorded in the consolidated statement of operations. Cash flows from derivative instruments are reported in the same cash flow category as the cash flows from the items being hedged.

The Company formally documents all relationships between hedging instruments and hedged items, as well as its risk management objective and strategy for undertaking various hedge transactions. This process includes relating all derivatives that are designated cash flow hedges to underlying forecasted transactions. The Company also formally assesses both at the inception of the hedge and on an ongoing basis, whether each hedging relationship is highly effective in achieving offsetting changes in fair values or cash flows of the hedged item during the period. If it is determined that a derivative is not highly effective as a hedge, or if a derivative ceases to be a highly effective hedge, hedge accounting would be discontinued with respect to that derivative prospectively.

Fair Value Measurements. The Company measures fair value using the guidelines under U.S. generally accepted accounting principles. Fair value is defined as the price at which an asset could be exchanged in a current transaction between market participants. A liability's fair value is defined as the amount that would be paid to transfer the liability to a market participant, not the amount that would be paid to settle the liability with the creditor. See Note 4 to these consolidated financial statements regarding the application of fair value measurements.

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The carrying values of cash, accounts receivable, accounts payable and accrued liabilities approximate fair value due to the short-term nature of these items. See Note 13 to these consolidated financial statements regarding the fair value of debt and Note 15 regarding other financial instruments.

Revenue Recognition. Revenue, net of related discounts and allowances, is recognized when both title and risk of loss of the product have been transferred to the customer, the seller's price to the buyer is fixed or determinable, collectability is reasonably assured, and persuasive evidence of an arrangement exists. Customers take title and assume all the risks of ownership based on delivery terms, which are generally included in customer contracts of sale, order confirmation documents and invoices.

The Company recognizes rebates given to customers as a reduction of revenue based on an allocation of the cost of honoring rebates earned and claimed to each of the underlying revenue transactions that result in progress by the customer toward earning the rebate. Rebates are recognized at the time revenue is recorded. The Company measures the rebate obligation based on the estimated amount of sales that will result in a rebate at the adjusted sales price per the respective sales agreement.

Shipping and Handling Costs. Amounts billed to a customer in a sale transaction related to shipping and handling, if any, represent revenues earned for the goods provided and is classified as revenue. Costs related to shipping and handling of products shipped to customers are classified as cost of goods sold.

Research and Development. Research and development costs of \$10,264, \$9,142, and \$8,661, for the years ended December 31, 2015, 2014, and 2013, respectively, were expensed as incurred and reported in selling, general and administrative expenses in the consolidated statements of operations.

Income Taxes. The Company operates within multiple taxing jurisdictions and is subject to tax filing requirements and audit within these jurisdictions. The Company uses the asset and liability method in accounting for income taxes. Deferred tax assets and liabilities are recorded for temporary differences between the tax basis of assets and liabilities and their reported amounts in the financial statements, using statutory tax rates in effect for the year in which the differences are expected to reverse. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the results of operations in the period that includes the enactment date. A valuation allowance is recorded to reduce the carrying amounts of deferred tax assets unless it is more likely than not that those assets will be realized.

In determining the provision for income taxes, the Company provides deferred income taxes on income from foreign subsidiaries as such earnings are taxable upon remittance to the United States. The Company establishes contingent liabilities for possible assessments by taxing authorities resulting from uncertain tax positions including, but not limited to, transfer pricing, deductibility of certain expenses and other state, local, and foreign tax matters. The Company recognizes a financial statement benefit for positions taken for tax return purposes when it will be more-likely-than-not that the positions will be sustained. The Company recognizes potential accrued interest and penalties related to unrecognized tax benefits in income tax expense. Tax examinations are often complex as tax authorities may disagree with the treatment of items reported by the Company and may require several years to resolve. These accrued liabilities represent a provision for taxes that are reasonably expected to be incurred on the basis of available information but which are not certain.

Asset Retirement Obligation. The Company records a liability when the fair value of any future obligation to retire a long-lived asset as a result of an existing or enacted law, statute, ordinance or contract is reasonably estimable. The Company also records a liability for the fair value of a conditional asset retirement obligation if

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the fair value can be reasonably estimated. When the liability is initially recorded, the Company capitalizes the cost by increasing the amount of the related long-lived asset. Over time, the Company adjusts the liability to its present value by recognizing accretion expense as an operating expense in the consolidated statement of operations each period, and the capitalized cost is depreciated over the useful life of the related asset. Upon settlement of the liability, the Company records a gain or loss if the actual costs differ from the accrued amount.

The Company has recorded asset retirement obligations (“ARO”) in other long-term liabilities in order to recognize legal obligations associated with the retirement of tangible long-lived assets. The Company has assessed whether an ARO is required at each manufacturing facility and has recorded an obligation for those location for which an obligation exists. The most significant of these are primarily attributable to environmental remediation liabilities associated with current operations that were incurred during the course of normal operations. The Company has AROs that are conditional in nature. The Company identified certain conditional AROs upon which it was able to reasonably estimate their fair value and recorded a liability. These AROs were triggered upon commitments by the Company to comply with local, state, and national laws to remove environmentally hazardous materials. The AROs have been recognized on a discounted basis using a credit adjusted risk free rate. Accretion of the AROs is recorded in other operating expense and amounted to \$304, \$296, and \$305, for the years ended December 31, 2015, 2014, and 2013, respectively. Following are changes in the ARO liability during the years ended December 31, 2015, 2014, and 2013:

	Year ended December 31,		
	2015	2014	2013
Beginning balance	\$ 3,452	\$ 3,310	\$ 3,065
Liabilities incurred	—	—	—
Liabilities settled	—	—	—
Accretion expense	304	296	305
Foreign exchange impact	(224)	(154)	(60)
Ending balance	<u>\$ 3,532</u>	<u>\$ 3,452</u>	<u>\$ 3,310</u>

Environmental Expenditures. Environmental expenditures that pertain to current operations or to future revenues are expensed or capitalized consistent with the Company’s capitalization policy for property, plant and equipment. Expenditures that result from the remediation of an existing condition caused by past operations and that do not contribute to current or future revenues are expensed. Liabilities are recognized for remedial activities when the remediation is probable and the cost can be reasonably estimated. Recoveries of expenditures for environmental remediation are recognized as assets only when recovery is deemed probable. See Note 20 to these consolidated financial statements regarding commitments and contingencies and Note 12 regarding the accrued environmental reserve.

Stock-Based Compensation. The Company applies the fair value based method to account for stock options and awards. See Note 18 to these consolidated financial statements regarding compensation expense associated with stock options and awards.

Pensions and Postretirement Benefits. The Company maintains qualified and non-qualified defined benefit pension plans that cover employees in the United States and Canada, as well as certain employees in other international locations. Benefits for a majority of the plans are based on average final pay and years of service. Our funding policy, consistent with statutory requirements, is based on actuarial computations utilizing the projected unit credit method of calculation. Not all defined benefit pension plans are funded. In the United States and Canada, the pension plans’ assets include equity and fixed income securities. In our other international

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locations, the pension plans' assets include equity and fixed income securities, as well as insurance policies. Certain assumptions are made regarding the occurrence of future events affecting pension costs, such as mortality, withdrawal, disablement and retirement, changes in compensation and benefits, and discount rates to reflect the time value of money.

The major elements in determining pension income and expense are pension liability discount rates and the expected return on plan assets. The Company references rates of return on high-quality, fixed income investments when estimating the discount rate, and the expected period over which payments will be made based upon historical experience. The long-term rate of return used to calculate the expected return on plan assets is the average rate of return estimated to be earned on invested funds for providing pension benefits.

In addition to pension benefits, the Company provides certain health care benefits for employees who meet age, participation and length of service requirements at retirement. These plans were closed to new retirees in the United States and Canada as of December 31, 2006. The Company uses explicit assumptions using the best estimates available of the plan's future experience. Principal actuarial assumptions include: discount rates, present value factors, retirement age, participation rates, mortality rates, cost trend rates, Medicare reimbursement rates and per capita claims cost by age. Current interest rates, as of the measurement date, are used for discount rates in present value calculations.

The Company also has defined contribution plans covering domestic employees of the Company and certain subsidiaries.

Contingencies. Certain conditions may exist as of the date the financial statements are issued, which may result in a loss to the Company but which will only be resolved when one or more future events occur or fail to occur. The Company's management and its legal counsel assess such contingent liabilities, and such assessment inherently involves an exercise of judgment. In assessing loss contingencies related to legal proceedings that are pending against the Company or unasserted claims that may result in such proceedings, the Company and legal counsel evaluates the perceived merits of any legal proceedings or unasserted claims as well as the perceived merits of the amount of relief sought or expected to be sought therein. If the assessment of a contingency indicates that it is probable that a loss has been incurred and the amount of the liability can be estimated, then the estimated liability is accrued in the Company's financial statements. If the assessment indicates that a loss contingency is not probable, but is reasonably possible, or is probable but cannot be estimated, then the nature of the contingent liability, together with an estimate of the range of possible loss if determinable and material, would be disclosed. Loss contingencies considered remote are generally not disclosed unless they involve guarantees, in which case the nature of the guarantee would be disclosed, including the approximate term, how the guarantee arose, and the events or circumstances that would require the guarantor to perform under the guarantee.

Use of Estimates. The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Out of period adjustment. Included in the 2015 financial statements are certain out of period adjustments relating to errors that originated in 2014 and 2013. During 2015, the Company recorded a \$3,064 charge to the provision for income taxes and a corresponding credit to deferred taxes related to an out of period adjustment associated with the accounting for deferred taxes of Convertible Preferred Equity Instrument (CPEC), a hybrid

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equity instrument. The Company has determined that the impact of these out of period adjustments were not material to any of the years presented.

3. Recently Issued Accounting Standards:

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 but will recognize expenses similar to current lease accounting. The guidance is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018. 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.

In November 2015, the Financial Accounting Standards Board (“FASB”) issued ASU2015-17, *Balance Sheet Classification of Deferred Taxes*. This guidance provides companies with the option to classify deferred tax liabilities and assets as non-current amounts, in a classified statement of financial position. For a particular tax paying component of an entity within a particular tax jurisdiction, all deferred tax liabilities and assets, as well as any related valuation allowance, shall be offset and presented as a single non-current amount. These new requirements for nonpublic entities become effective for annual reporting periods beginning after December 15, 2017 and interim periods with annual reporting periods after December 15, 2018. A nonpublic entity may elect early application as of the beginning of an interim or annual period. The Company has elected to adopt the requirements of this standard as of December 31, 2015. In accordance with ASU 2015-17, in the December 31, 2014 consolidated balance sheet, the Company credited the current deferred tax asset by \$8,076 and debited the current deferred tax liability by \$6, concurrently debiting the non-current deferred tax asset and the non-current deferred tax liability by \$1,653 and \$6,417, respectively.

In September 2015, the FASB issued guidance that will change the requirements for reporting measurement period adjustments to provisional amounts initially recognized in conjunction with a business combination. Under GAAP, an acquiring entity currently is required to retrospectively adjust, in prior period financial statements, the provisional amounts to reflect new information obtained during the measurement period (a period, which may not exceed one year from the date of the business combination, during which the acquiring entity may receive information about the facts and circumstances existing as of the acquisition date that, if known, would have affected the measurement of the amounts recognized as of the acquisition date). Under the new guidance, adjustments to the provisional amounts will be reflected in the financial statements for the reporting period in which the adjustments are determined, including by recognizing in current period earnings the full effect of changes in depreciation, amortization or other income effects. The guidance requires that the acquiring entity either present separately on the face of the current period income statement or disclose in the notes to the current period financial statement, by line item, the amount of the adjustments made during the current period. The new guidance will be effective for fiscal years beginning after December 15, 2016, and interim periods within fiscal years beginning after December 15, 2017. The amendments should be applied prospectively to adjustments to provisional amounts that occur after the effective date of the guidance with earlier application permitted for financial statements that have not yet been made available for issuance. The Company does not expect this guidance to have a significant impact on its consolidated financial statements.

In April 2015, the FASB issued accounting guidance (ASU2015-03, *Simplifying the Presentation of Debt Issuance Costs*) that requires deferred financing costs to be presented as a direct reduction from the related debt liability in the financial statements rather than as a separately recognized asset, as is the current requirement under U.S. GAAP. Under the new guidance, amortization of such costs will continue to be reported as interest expense. In August 2015, the FASB issued updated guidance (ASU 2015-15 *Presentation and Subsequent*

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Measurement of Debt Issuance Costs Associated with Line-of-Credit Arrangements) to include similar treatment for deferred financing costs associated with line of credit arrangements. The new guidance will be effective for interim and annual periods beginning after December 15, 2015 and must be adopted on a retrospective basis. Early adoption is permitted. The Company has elected to adopt the requirements of this standard as of December 31, 2015. In accordance with ASU 2015-03, the Company has presented net deferred financing costs of \$4,228 and \$6,141 as of December 31, 2015 and 2014, respectively, as a direct reduction of long term debt.

In January 2015, the FASB issued ASU 2015-01, *Simplifying Income Statement Presentation by Eliminating the Concept of Extraordinary Items*. Under this ASU, an entity will no longer be allowed to separately disclose extraordinary items, net of tax, in the income statement after income from continuing operations if an event or transaction is unusual in nature and occurs infrequently. ASU 2015-01 is effective for interim and annual reporting periods beginning after December 15, 2015 with early adoption permitted. The Company has adopted ASU 2015-01 effective December 31, 2015. The adoption did not have any impact on the Company's financial position, results of operations or cash flows.

In November 2014, the FASB issued new accounting guidance ASU 2015-08 that provides companies with the option to apply pushdown accounting in its separate financial statements upon occurrence of an event in which an acquirer obtains control of the acquired entity. The acquired entity may elect the option to apply pushdown accounting in the reporting period in which the change-in-control event occurs. If pushdown accounting is not applied in the reporting period in which the change-in-control event occurs, an acquired entity will have the option to elect to apply pushdown accounting in a subsequent reporting period as a change in accounting principle under GAAP. If pushdown accounting is applied to an individual change-in-control event, that election is irrevocable. This guidance also requires an acquired entity that elects the option to apply pushdown accounting in its separate financial statements to disclose information in the current reporting period that enables users of financial statements to evaluate the effect of pushdown accounting. The Company has adopted this guidance effective November 18, 2014, as the amendments are effective upon issuance. The adoption of this new guidance did not have any impact on its consolidated financial statements and related disclosures.

In August 2014, the FASB issued guidance regarding management's responsibility to evaluate whether there is substantial doubt about an entity's ability to continue as a going concern within one year of the issuance of the financial statements. If substantial doubt exists, additional disclosures would be required. This guidance will be effective beginning in the fourth quarter of fiscal year 2017, with early adoption permitted. The Company does not expect this guidance to have a significant impact on its consolidated financial statements.

In May 2014, the FASB issued accounting guidance 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 judgments made in applying the revenue guidance, and assets recognized related to the costs to obtain or fulfill a contract. These new requirements for nonpublic entities become effective for annual reporting periods beginning after December 15, 2018, and interim periods within fiscal years beginning after December 15, 2019. A nonpublic entity may elect early application, but no earlier than

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December 15, 2017, the effective date for public entities. The Company is assessing the impact of these new requirements on our financial statements.

In April 2014, the FASB issued authoritative guidance amending existing requirements for reporting discontinued operations. Under the new guidance, discontinued operations reporting will be limited to disposal transactions that represent strategic shifts having a major effect on operations and financial results. The amended guidance also enhances disclosures and requires assets and liabilities of a discontinued operation to be classified as such for all periods presented in the financial statements. Public entities will apply the amended guidance prospectively to all disposals occurring within annual periods beginning on or after December 15, 2014 and interim periods within those years. The Company has adopted this standard on January 1, 2015. Due to the change in requirements for reporting discontinued operations described above, presentation and disclosures of future disposal transactions after adoption may be different than under current standards.

In July 2013, the FASB issued ASU 2013-11 *Presentation of an Unrecognized Tax Benefit When a Net Operating Loss Carryforward, a Similar Tax Loss, or a Tax Credit Carryforward Exists*. This update is intended to improve the consistency surrounding the presentation of an unrecognized tax benefit when a net operating loss carryforward exists, requiring the unrecognized tax benefit to be presented as a reduction to a deferred tax asset for a net operating loss carryforward, a similar tax loss, or a tax credit carryforward. The new requirements for nonpublic entities are effective for fiscal years beginning after December 15, 2014, and for interim periods within those fiscal years, with early adoption permitted. The Company has implemented the provisions of ASU 2013-11 in 2015.

4. Fair Value Measurements:

Fair values are based on quoted market prices when available. When market prices are not available, fair value is 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 value 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 which 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.

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- 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 are measured at fair value on a recurring basis as of December 31, 2015 and 2014, and indicates the fair value hierarchy of the valuation techniques the Company utilized to determine such fair value. Financial assets and liabilities measured at fair value on a recurring basis are summarized as follows:

	As of December 31, 2015	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Restoration plan assets	\$ 5,927	\$ 5,927	\$ —	\$ —
Total	\$ 5,927	\$ 5,927	\$ —	\$ —
Liabilities:				
Derivative contracts	\$ 3,946	\$ —	\$ 3,946	\$ —
Total	\$ 3,946	\$ —	\$ 3,946	\$ —

	As of December 31, 2014	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Derivative contracts	\$ 49	\$ —	\$ 49	\$ —
Restoration plan assets	7,134	7,134	—	—
Total	\$ 7,183	\$ 7,134	\$ 49	\$ —
Liabilities:				
Derivative contracts	\$ 4,209	\$ —	\$ 4,209	\$ —
Total	\$ 4,209	\$ —	\$ 4,209	\$ —

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 17 to these 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

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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 Holdings Inc. 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 December 31, 2015 and 2014 the credit valuation adjustment resulted in a minimal change in the fair value of the derivatives.

5. Accumulated Other Comprehensive Loss:

The following table presents cumulative changes in accumulated other comprehensive loss, net of tax for December 31, 2015, 2014, and 2013:

	December 31,		
	2015	2014	2013
Amortization and unrealized losses on pension and post retirement plans, net of tax of \$26,739, \$26,515, and \$16,637	\$ (47,587)	\$ (49,474)	\$ (31,176)
Unrecognized prior service credits (costs) on pension and post retirement plans, net of tax of \$207, \$174, and \$137	(619)	(508)	(395)
Net changes in fair values of derivatives, net of tax of \$1,735, \$1,899, and \$352	(2,624)	(2,881)	(455)
Foreign currency translation adjustments, net of tax of (\$14,839), (\$10,778), and (\$5,881)	(81,143)	(43,774)	(19,729)
	<u>\$ (131,973)</u>	<u>\$ (96,637)</u>	<u>\$ (51,755)</u>

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The following tables present the pre-tax, tax, and after-tax components of other comprehensive income (loss) for the twelve months ended December 31, 2015, 2014, and 2013:

	Twelve months ended December 31,								
	2015			2014			2013		
	Pre-tax amount	Tax benefit / (expense)	After-tax amount	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 gains (losses)	\$ 1,664	\$ 224	\$ 1,888	\$(28,176)	\$ 9,878	\$(18,298)	\$ 26,783	\$ (9,389)	\$ 17,394
Unrecognized prior service costs	(145)	33	(112)	(150)	37	(113)	(171)	42	(129)
Benefit plans, net	1,519	257	1,776	(28,326)	9,915	(18,411)	26,612	(9,347)	17,265
Net gain (loss) from hedging activities	421	(164)	257	(3,973)	1,547	(2,426)	2,765	(1,065)	1,700
Foreign currency translation	(34,354)	(4,061)	(38,415)	(19,986)	(4,897)	(24,883)	(18,233)	459	(17,774)
Other comprehensive (loss) income	<u>\$ (32,414)</u>	<u>\$ (3,968)</u>	<u>\$ (36,382)</u>	<u>\$ (52,285)</u>	<u>\$ 6,565</u>	<u>\$ (45,720)</u>	<u>\$ 11,144</u>	<u>\$ (9,953)</u>	<u>\$ 1,191</u>

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The following table presents the change in accumulated other comprehensive loss, net of tax, by component for the twelve months ended December 31, 2015, 2014, and 2013. Amounts in parentheses indicate debits.

	Defined benefit and other postretirement plans	Net gain (loss) from hedging activities	Foreign currency translation	Total
December 31, 2012	\$ (48,836)	\$ (2,155)	\$ (1,856)	\$ (52,847)
Other comprehensive income (loss) before reclassifications	15,513	437	(17,873)	(1,923)
Amounts reclassified from accumulated other comprehensive income ^(a)	1,752	1,263	—	3,015
Net current period other comprehensive income (loss)	17,265	1,700	(17,873)	1,092
December 31, 2013	\$ (31,571)	\$ (455)	\$ (19,729)	\$ (51,755)
Other comprehensive income (loss) before reclassifications	(19,249)	(2,526)	(24,045)	(45,820)
Amounts reclassified from accumulated other comprehensive income ^(a)	838	100	—	938
Net current period other comprehensive income (loss)	(18,411)	(2,426)	(24,045)	(44,882)
December 31, 2014	\$ (49,982)	\$ (2,881)	\$ (43,774)	\$ (96,637)
Other comprehensive income (loss) before reclassifications	3,359	3,124	(37,369)	(30,886)
Amounts reclassified from accumulated other comprehensive income ^(a)	(1,583)	(2,867)	—	(4,450)
Net current period other comprehensive income (loss)	1,776	257	(37,369)	(35,336)
December 31, 2015	<u>\$ (48,206)</u>	<u>\$ (2,624)</u>	<u>\$ (81,143)</u>	<u>\$ (131,973)</u>

(a) See following table for details about these reclassifications

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The following table presents the reclassifications out of accumulated other comprehensive loss for the twelve months ended December 31, 2015, 2014, and 2013. Amounts in parentheses indicate debits to profit / loss.

<u>Details about Accumulated Other Comprehensive Income Components</u>	<u>Amount Reclassified from Accumulated Other Comprehensive Income</u>			<u>Affected Line Item in the Statement Where Net Income is Presented</u>
	<u>Twelve months ended</u>			
	<u>December 31,</u>			
	<u>2015</u>	<u>2014</u>	<u>2013</u>	
Defined benefit and other postretirement plans				
Amortization of prior service cost	\$ 151	\$ 151	\$ 178	(a)
Amortization of net gain (loss)	(2,506)	(1,375)	(2,725)	(a)
	<u>(2,355)</u>	<u>(1,224)</u>	<u>(2,547)</u>	Total before tax
	772	386	795	Tax (expense) benefit
	<u>\$ (1,583)</u>	<u>\$ (838)</u>	<u>\$ (1,752)</u>	Net of tax
Net gain (loss) from hedging activities				
Interest rate caps	\$ (398)	\$ (1,434)	\$ (1,703)	Interest expense
Natural gas swaps	(4,226)	1,271	(350)	Cost of goods sold
	<u>(4,624)</u>	<u>(163)</u>	<u>(2,053)</u>	Total before tax
	1,757	63	790	Tax (expense) benefit
	<u>\$ (2,867)</u>	<u>\$ (100)</u>	<u>\$ (1,263)</u>	Net of tax
Total reclassifications for the period	<u>\$ (4,450)</u>	<u>\$ (938)</u>	<u>\$ (3,015)</u>	Net of tax

(a) These accumulated other comprehensive income (loss) components are included in the computation of net periodic pension cost (see Note 17 for additional details)

6. Other Operating Expense:

A summary of significant other operating expense is as follows:

	<u>Year ended December 31,</u>		
	<u>2015</u>	<u>2014</u>	<u>2013</u>
Amortization expense	\$ 30,536	\$ 31,438	\$ 32,217
Transaction related costs	10,665	24,279	5,800
Management advisory fee	5,000	5,000	5,000
Environmental related costs	1,817	5,015	1,946
Demolition related costs	—	2,314	1,111
Restructuring, plant closure and severance related costs	3,672	729	1,010
Asset impairment	425	—	948
Net loss on asset disposals	1,548	694	653
Asset retirement obligation accretion	304	296	305
Sales of NOx credits	(4,037)	—	—
Bad debt, net	231	390	246
Other, net	1,355	993	137
	<u>\$ 51,516</u>	<u>\$ 71,148</u>	<u>\$ 49,373</u>

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7. Accounts Receivable and Allowance for Doubtful Accounts:

The components of accounts receivable are presented as follows:

	<u>December 31,</u>	
	<u>2015</u>	<u>2014</u>
Trade accounts receivable	\$ 119,908	\$ 125,287
Allowance for doubtful accounts	(2,470)	(2,710)
	<u>\$ 117,438</u>	<u>\$ 122,577</u>

Following are changes in the allowance for doubtful accounts during the years ended December 31, 2015, 2014, and 2013:

	<u>Year ended December 31,</u>		
	<u>2015</u>	<u>2014</u>	<u>2013</u>
Beginning balance	\$(2,710)	\$(3,652)	\$(3,607)
Decreases (increases)	(231)	(374)	(253)
Write-offs, net of recoveries	221	1,078	213
Foreign exchange impact	250	238	(5)
Ending balance	<u>\$(2,470)</u>	<u>\$(2,710)</u>	<u>\$(3,652)</u>

8. Inventories:

Inventories were classified and valued as follows:

	<u>December 31,</u>	
	<u>2015</u>	<u>2014</u>
Finished products and work in process	\$ 149,723	\$ 140,780
Raw materials	47,370	48,506
	<u>\$ 197,093</u>	<u>\$ 189,286</u>
Valued at lower of cost or market:		
LIFO basis	\$ 115,654	\$ 103,090
FIFO or average cost basis	81,439	86,196
	<u>\$ 197,093</u>	<u>\$ 189,286</u>

If inventories valued under the LIFO basis had been valued using the FIFO method, inventories would have been \$4,729 and \$2,641 lower than reported at December 31, 2015 and 2014, respectively. The higher LIFO basis of inventory compared to the FIFO method is due to the purchase accounting fair value step-up of inventory associated with the 2007 Merger and subsequent acquisitions.

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9. 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 December 31, 2015 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:

	December 31,	
	2015	2014
Current assets	\$ 174,458	\$ 162,854
Noncurrent assets	197,370	171,525
Current liabilities	37,803	40,724
Noncurrent liabilities	17,112	24,921

	Twelve months ended December 31,		
	2015	2014	2013
Net sales	\$ 344,632	\$ 240,254	\$ 337,277
Gross profit	133,966	89,436	142,781
Operating income	97,149	54,728	112,171
Net income	95,432	63,502	112,419

The Company's investment in affiliates balance as of December 31, 2015 and 2014 includes net purchase accounting fair value adjustments of \$66,207 and \$68,593, respectively, consisting primarily of intangible assets such as customer relationships, formulations and product technology, and tradenames. Consolidated equity in net income from affiliates is net of \$2,387, \$2,387, and \$2,387, of amortization expense related to purchase accounting fair value adjustments for the year ended December 31, 2015, 2014, and 2013.

The following table summarizes the activity related to the investments in affiliates balance on the consolidated balance sheet:

	Twelve months ended December 31,		
	2015	2014	2013
Balance at beginning of period	\$ 202,745	\$ 201,911	\$ 163,223
Equity in net income of affiliated companies	47,712	31,746	56,195
Charges related to purchase accounting fair value adjustments	(2,387)	(2,387)	(2,387)
Dividends received	(30,089)	(34,255)	(33,050)
Investment in Zeolyst C.V.	10,000	10,000	18,000
Dissolution of investment in Nippon Highway Materials	—	—	9
Changes in foreign currency translation adjustments	(3,501)	(4,270)	(79)
Balance at end of period	<u>\$ 224,480</u>	<u>\$ 202,745</u>	<u>\$ 201,911</u>

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The Company had net receivables due from affiliates of \$4,410 and \$3,407 as of December 31, 2015 and 2014, respectively, which are included in prepaid and other current assets. Net receivables due from affiliates are generally non-trade receivables. Sales to and purchases from affiliates were not material for the years presented.

10. Property, Plant and Equipment:

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

	<u>December 31,</u>	
	<u>2015</u>	<u>2014</u>
Land	\$ 77,239	\$ 82,494
Buildings	177,723	174,295
Machinery and equipment	600,682	570,629
Construction in progress	115,336	91,380
	<u>970,980</u>	<u>918,798</u>
Less: accumulated depreciation	<u>(401,812)</u>	<u>(372,082)</u>
	<u>\$ 569,168</u>	<u>\$ 546,716</u>

Depreciation expense was \$62,586, \$59,904, and \$57,089, for the years ended December 31, 2015, 2014, and 2013, respectively.

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11. Goodwill and Other Intangible Assets:

The changes in the carrying amount of goodwill for the years ended December 31, 2015 and 2014 is summarized as follows:

	Performance Chemicals Americas & Australia	Performance Chemicals EMEA & Asia	Catalysts	Specialty Glass Materials	Total
Balance as of January 1, 2015					
Goodwill	\$ 277,153	\$ 166,776	\$ 132,770	\$ 209,673	\$ 786,372
Accumulated impairment losses	—	—	—	(65,031)	(65,031)
Total	277,153	166,776	132,770	144,642	721,341
Goodwill acquired during the year	9,896	—	—	—	9,896
Foreign exchange impact	(979)	(11,012)	(1,635)	(151)	(13,777)
Balance as of December 31, 2015					
Goodwill	286,070	155,764	131,135	209,522	782,491
Accumulated impairment losses	—	—	—	(65,031)	(65,031)
Total	<u>\$ 286,070</u>	<u>\$ 155,764</u>	<u>\$ 131,135</u>	<u>\$ 144,491</u>	<u>\$ 717,460</u>
Balance as of January 1, 2014					
Goodwill	\$ 277,528	\$ 175,851	\$ 134,059	\$ 209,887	\$ 797,325
Accumulated impairment losses	—	—	—	(65,031)	(65,031)
Total	277,528	175,851	134,059	144,856	732,294
Foreign exchange impact	(375)	(9,075)	(1,289)	(214)	(10,953)
Balance as of December 31, 2014					
Goodwill	277,153	166,776	132,770	209,673	786,372
Accumulated impairment losses	—	—	—	(65,031)	(65,031)
Total	<u>\$ 277,153</u>	<u>\$ 166,776</u>	<u>\$ 132,770</u>	<u>\$ 144,642</u>	<u>\$ 721,341</u>

On May 1, 2015, the Company acquired certain assets and liabilities of a sodium silicate plant within the Performance Chemicals business of the Company for a total purchase price of \$12,000. The Company accounted for the acquisition of these assets in accordance with ASC 805, "Business Combinations." Under the purchase method of accounting, the acquired assets were recorded at their respective fair values as of the date of acquisition. The purchase price was allocated to tangible assets acquired and liabilities assumed based upon their estimated fair values. The fair value of identifiable assets acquired and liabilities assumed was \$3,143 and \$1,039, respectively, and principally included the acquisition of property, plant and equipment of \$2,454, inventory of \$689, and assumed liabilities of \$1,039. The purchase price allocation, which is based on the estimated fair value of net assets acquired, resulted in the Company recording goodwill of \$9,896. The Company believes that expected synergies of the acquisition is the primary reason that contributed to a total purchase price that resulted in the recognition of goodwill. Goodwill is expected to be fully deductible for tax purposes. The pro forma impact of this acquisition would not have been material to the Company's results of operations for the years ended December 31, 2015 and 2014 respectively.

The Company completed its annual impairment assessments as of October 1, 2015 and 2014. For the annual assessments, the Company performed the two-step quantitative assessment for each of the reporting units. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly

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transaction between market participants at the measurement date. To determine the fair value of each reporting unit, the Company generally uses a market approach and an income, or discounted cash flow, approach.

In 2014, the Company determined fair value of its reporting units using only a market approach. The market value was estimated using publicly traded comparable company values by applying their most recent EBITDA multiples to the reporting unit's trailing twelve months EBITDA as well as indicative values from the 2014 Stock Purchase. As part of the 2014 Stock Purchase, the Company received bids on the various businesses which were used to value its reporting units as part of the market approach.

In 2015, the Company determined fair value of its reporting units using both a market approach and an income, or discounted cash flow, approach. Estimating the fair value of a reporting unit requires various assumptions including the use of projections of future cash flows and discount rates that reflect the risks associated with achieving those cash flows. The key assumptions used in estimating the fair values were the operating margin growth rates, revenue growth rates from implementation of strategic plans, the weighted average cost of capital, the perpetual growth rate, and the estimated earnings market multiples of each reporting unit. The market value was estimated using publicly traded comparable company values by applying their most recent EBITDA multiples to the reporting unit's trailing twelve months EBITDA. The income approach value was estimated using a discounted cash flow approach. The assumptions about future cash flows and growth rates are based on management's assessment of a number of factors including the reporting unit's recent performance against budget as well as management's ability to execute on planned future strategic initiatives. Discount rate assumptions are based on an assessment of the risk inherent in those future cash flows.

At October 1, 2015 and 2014, the fair value of each of the five reporting units exceeded their respective carrying values and, therefore, step two was not required.

The Company has trade names that are not subject to amortization of \$104,415 and \$108,972 as of December 31, 2015 and 2014, respectively. The change in trade names during the year was due to the foreign currency impact. The Company performed an annual quantitative assessment on its intangibles not subject to amortization and concluded that no impairment charge was warranted.

Gross carrying amounts and accumulated amortization for intangible assets with estimable useful lives are as follows:

	December 31, 2015			December 31, 2014		
	Gross Amounts	Accumulated Amortization	Net Balance	Gross Amounts	Accumulated Amortization	Net Balance
Formulations and product technology	\$ 54,263	\$ (37,192)	\$ 17,071	\$ 55,490	\$ (33,361)	\$ 22,129
Customer relationships	412,029	(209,809)	202,220	415,671	(186,949)	228,722
Trademarks	1,650	(1,471)	179	1,650	(1,306)	344
Patents	511	(364)	147	574	(366)	208
Total	\$ 468,453	\$ (248,836)	\$ 219,617	\$ 473,385	\$ (221,982)	\$ 251,403

The amortization periods for formulations and product technology range from seven to twelve years. The Company amortizes customer relationships over periods that range from nine to twenty years. Amortizable trademarks are amortized over a ten year period. The amortization periods for the patents range from eight to fourteen years.

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During the year ended December 31, 2015, 2014 and 2013, the Company wrote off fully amortized patents totaling \$63, \$4,047 and \$338, respectively. During the year ended December 31, 2014 and 2013, the Company wrote off fully amortized noncompete agreements totaling \$3,269 and \$231, respectively

Total amortization of intangibles was \$30,536, \$31,438, and \$32,217, for the years ended December 31, 2015, 2014, and 2013, respectively and is recorded in other operating expense in the consolidated statement of operations

Estimated future aggregate amortization expense of intangible assets is as follows:

Year	Amount
2016	\$ 30,273
2017	27,663
2018	25,270
2019	23,863
2020	21,355
Thereafter	91,193
Total estimated future aggregate amortization expense	<u>\$ 219,617</u>

12. Accrued Liabilities:

The following table summarizes the components of accrued liabilities as follows:

	December 31,	
	2015	2014
Compensation and bonus	\$26,490	\$31,133
Interest	11,730	11,710
Pension and other post retirement benefits	1,048	1,317
Supplemental retirement plans	1,168	1,167
Income taxes	8,161	8,150
Natural gas hedge agreements	3,119	3,606
Commissions and rebates	2,367	2,471
Environmental reserves	6,919	7,615
Property tax	1,229	1,082
Management sponsor fee	2,781	41
INEOS Group liability (see Note 20)	2,294	2,341
Other	6,191	7,471
Total	<u>\$73,497</u>	<u>\$78,104</u>

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13. Long-term Debt:

The summary of long-term debt is as follows:

	December 31,	
	2015	2014
Senior secured term loans with interest at 4.00% as of December 31, 2015 and as of December 31, 2014 (due August 2017)	\$ 1,197,950	\$ 1,210,300
Senior secured notes with interest at 8.75% as of December 31, 2015 and as of December 31, 2014 (due November 2018)	600,000	600,000
Revolving credit facility (due May 2017)	—	—
Other	23,158	23,184
Total debt	1,821,108	1,833,484
Original issue discount	(13,117)	(19,939)
Deferred financing costs	(4,228)	(6,141)
Total debt, net of original issue discount and deferred financing costs	1,803,763	1,807,404
Less: current portion	(14,508)	(14,534)
Total long-term debt	\$ 1,789,255	\$ 1,792,870

As discussed in Note 3, the Company has elected to adopt the requirements of ASU2015-03 as of December 31, 2015. In accordance with ASU2015-03, the Company has presented net deferred financing costs of \$4,228 and \$6,141 as of December 31, 2015 and 2014, respectively, as a direct reduction of long term debt in the table above.

On February 15, 2013, the Company re-priced its senior secured terms loans to lower the applicable interest rate. The Company repaid all outstanding senior secured term loans in the aggregate amount of \$1,220,000 including accrued interest of \$11,762 and a prepayment premium of 1.00% of the principal amount of the existing term loans, or \$12,200, and issued new senior secured term loans in an aggregate principal amount of \$1,235,000 (the "2013 Term Loans"). The Company incurred early debt repayment fees of \$12,200, of which \$6,508 was recorded as original issue discount to long-term debt and \$5,692 was immediately written off as debt extinguishment costs. The Company also recorded \$1,771 of new third party financing costs as deferred financing fees. In addition, previous unamortized deferred financing costs of \$2,592 and original issue discount of \$11,993 associated with the old debt were written off as debt extinguishment costs.

On March 27, 2014, the Company re-priced its senior secured terms loans to lower the applicable interest rate. The Company repaid all outstanding senior secured term loans in the aggregate amount of \$1,222,650 including accrued interest of \$2,971 and issued new senior secured term loans in an aggregate principal amount of \$1,222,650 (the "2014 Term Loans"). The 2014 Term Loans have substantially identical terms to the existing term loans except borrowings under the 2014 Term Loans bear interest at a rate equal to the LIBOR rate or the base rate elected by the Company at the time of borrowing plus a margin of 3.00% or 2.00%, respectively. In addition, a prepayment premium of 1.00% will be payable on the 2014 Term Loans in the event of a re-pricing transaction prior to the one year anniversary of the effective date of the 2014 Term Loans. The Company recorded \$536 of new creditor fees as original issue discount in long-term debt. In addition, previous unamortized deferred financing costs of \$264 and original issue discount of \$2,212 associated with the old debt were written off to debt extinguishment costs.

The Company incurred deferred financing fees associated with the financing of its debt. Such deferred financing costs are amortized over the terms of the related agreements. Amortization of deferred costs of \$1,913,

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\$1,967, and \$1,892, for the years ended December 31, 2015, 2014, and 2013, were included in interest expense. In addition, the Company paid original issue discount associated with the financing of its debt. The original issue discount is amortized over the terms of the related agreements. Amortization of original issue discount of \$6,822, \$6,932, and \$7,535, for the years ended December 31, 2015, 2014, and 2013, were included in interest expense.

Senior Secured Term Loans and Revolving Credit Facility

On November 8, 2012, the Company entered into a new senior secured credit facility having a first lien term loan in the amount of \$1,220,000 with a maturity date of May 8, 2017. Borrowings under the first lien term facilities bear interest at a rate equal to the LIBOR rate or the base rate elected by the Company at the time of borrowing plus a margin of 4.25% or 3.25%, respectively. Further, the LIBOR or base rate elected under the facilities are also subject to a floor of 1.00% and 2.00%, respectively. The senior credit facility requires minimum quarterly principal payments of \$3,050 on the first lien term loan, though such minimum payments may be reduced in accordance with any prepayments or increased if the amount of the Term Loans is increased.

On February 15, 2013, the Company re-priced its senior secured terms loans to lower the applicable interest rate and issued the 2013 Term Loans of \$1,235,000. The 2013 Term Loans have substantially identical terms to the existing term loans except borrowings under the 2013 Term Loans bear interest at a rate equal to the LIBOR rate or the base rate elected by the Company at the time of borrowing plus a margin of 3.50% or 2.50%, respectively. In addition, the minimum quarterly principal payments increased to \$3,088, the maturity date was extended to August 7, 2017, and the prepayment premium of 1.00% will be payable on the 2013 Term Loans in the event of a re-pricing transaction prior to the one year anniversary of the effective date of the 2013 Term Loans.

On March 27, 2014, the Company re-priced its senior secured terms loans to lower the applicable interest rate and issued the 2014 Term Loans of \$1,222,650. The 2014 Term Loans have substantially identical terms to the existing term loans except borrowings under the 2014 Term Loans bear interest at a rate equal to the LIBOR rate or the base rate elected by the Company at the time of borrowing plus a margin of 3.00% or 2.00%, respectively. In addition, a prepayment premium of 1.00% will be payable on the 2014 Term Loans in the event of a re-pricing transaction prior to the one year anniversary of the effective date of the 2014 Term Loans.

The loans and guarantees under the senior credit facility are secured by first-priority liens in substantially all of the tangible and intangible assets of PQ Corporation and certain of its material subsidiaries, including pledges of all present and future shares of capital stock of PQ Corporation and certain guarantors and each of PQ Corporation's and such guarantors' material directly wholly-owned domestic subsidiaries and 65% of the present and future shares of capital stock of each of PQ Corporation's and such guarantors' directly owned foreign restricted subsidiaries (other than certain Cayman subsidiaries which guarantee the senior credit facility), in each case subject to certain thresholds, exceptions and customary permitted liens.

The senior credit facility further requires prepayments from all "net cash proceeds" received and "excess cash flow," if applicable. In accordance with the senior credit facility, net cash proceeds generally relate to proceeds received from the issuance or incurrence of certain indebtedness or proceeds received on the disposition of assets, adjusted for certain costs and expenses, and are payable promptly upon receipt, subject in the case of net cash proceeds from asset dispositions, to meeting the thresholds described below. Net cash proceeds in respect of asset dispositions are not payable if such proceeds are reinvested in the Company's business within a certain specified time period or if they are under certain minimum amounts, both on an individual basis for any given disposition and in the aggregate for dispositions that, individually, would not meet the threshold. Excess cash flow is to be calculated annually and is defined as consolidated net income adjusted for various expenditures

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and/or proceeds commencing with the fiscal year ending on December 31, 2014. Prepayments with respect to excess cash flow, if any, are to be made on an annual basis due within 10 days after the annual audited financials are delivered to the lenders thereunder of each year. The detailed calculations supporting those two prepayments are defined in the credit agreement. The remaining principal balance of the term loans are due upon maturity.

The senior credit facility provides for up to \$150,000 in revolving credit borrowings. Borrowings under the revolving facility bear interest at a rate equal to the LIBOR or base rate elected by the Company at the time of borrowing plus a margin of 4.25% or 3.25%, respectively, subject to reduction based on certain leverage thresholds. In addition, there is an annual commitment fee equal to 0.50%, with a step-down to 0.25% based on certain leverage thresholds of the unused revolving credit borrowings available under the senior credit facility. Revolving credit borrowings are payable at the option of the Company throughout the term of the senior credit facility with the balance due May 8, 2017. As of December 31, 2015, there were no revolving credit borrowings under the senior credit facility. In accordance with the terms of the Company's senior credit facility, repayments made by the Company relating to outstanding revolver borrowings are applied to all lenders on a pro-rata basis, subject to certain exceptions.

The senior credit facility contains various non-financial restrictive covenants. It limits the ability of PQ Corporation and its restricted subsidiaries to incur certain indebtedness or liens, merge, consolidate or liquidate, dispose of certain property, make investments or declare or pay dividends, make optional payments, modify certain debt instruments, enter into certain transactions with affiliates, or enter into certain sales and leasebacks, and it also provides limitation on other non-financial restrictive covenants. The Senior Credit Facility also contains one financial restrictive covenant. Commencing at the end of the first full fiscal quarter after the effective date of the Agreement, which was November 8, 2012, as of the end of any fiscal quarter of the Company for the four fiscal quarter period ending on such date, the Company's Total Net First Lien Leverage Ratio, as defined, must be less than 5.75:1.00 (4.75:1.00 as of December 31, 2015), with annual step-downs. At December 31, 2015, the Company was in compliance with all loan covenants.

The Company may at any time or from time to time voluntarily prepay the senior secured loans in whole or in part without premium or penalty, except prior to the one year anniversary of the closing date, the Company shall pay a prepayment premium in an amount equal to 1.00% of the principal amount prepaid.

The Company has a \$35,000 letter of credit sublimit under the senior credit facility subject to the availability under the revolving credit facility. The Company has letters of credit outstanding of \$5,279 as of December 31, 2015, which reduce available borrowings under the revolving credit facility by such amounts.

Senior Secured Notes

On November 8, 2012, the Company issued \$600,000 of 8.750% second lien senior secured notes due 2018 in transactions exempt from or not subject to registration under the Securities Act pursuant to Rule 144A and Regulation S under the Securities Act of 1933. The notes are senior secured obligations of the Company and rank equally in right of payment with all of the Company's existing and future senior debt and senior in right of payment to all of the Company's existing and future subordinated debt. The notes will be effectively subordinated to all of the Company's first lien senior secured debt, including the senior secured credit facility, to the extent of the value of the assets securing such debt. The notes will also be structurally subordinated to the liabilities of PQ Corporation's existing and future non-guarantor subsidiaries. The indenture relating to the notes contains various limitations on the Company's and its restricted subsidiaries' ability to incur additional indebtedness, pay dividends or repay certain debt, make loans and investments, sell assets, create liens, enter into transactions with affiliates, enter into agreements restricting PQ Corporation's subsidiaries ability to pay dividends, and merge and

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consolidate with other companies, among other things. Interest on the notes is payable on May 1 and November 1 of each year, commencing May 1, 2013. No principal payments are required with respect to the notes prior to their final maturity. The notes mature on November 1, 2018. The obligations of the Company under the notes and the indenture are guaranteed by Holdings and CPQ Midco I Corporation, PQ Corporation's direct parent, and each of PQ Corporation's subsidiaries that is a guarantor under the new senior secured credit facility. The obligations of the Company under the notes and the indenture are secured by second-priority liens over substantially all of the tangible and intangible assets of Holdings and certain of its material subsidiaries, including pledges of all present and future shares of capital stock of CPQ Midco I Corporation, PQ Corporation and certain guarantors and each of PQ Corporation's and such guarantors' material directly wholly-owned domestic subsidiaries and 65% of the present and future shares of capital stock of each of PQ Corporation's and such guarantors' directly owned foreign restricted subsidiaries (other than certain Cayman subsidiaries which guarantee the notes), in each case subject to certain thresholds, exceptions and customary permitted liens.

If any event of default (other than a default relating to certain events of bankruptcy or insolvency of PQ Corporation or certain of its subsidiaries) shall occur and be continuing, the trustee or holders of at least 25% in principal amount of outstanding notes under the indenture may declare the principal of, premium, if any, and accrued but unpaid interest on all the notes to be due and payable and the same shall become immediately due and payable. If an event of default arising from certain events of bankruptcy or insolvency of the Company occurs, the principal of, premium, if any, and interest on all the notes shall become immediately due and payable without any declaration or other act on the part of the trustee or any holders.

Upon the occurrence of a Change of Control, each holder will have the right to require the Company to purchase all or any part of such holder's notes at a purchase price in cash equal to 101% of the principal amount, plus accrued and unpaid interest.

Other Debt

On October 24, 2013, the Company's subsidiary Potters Industries, LLC ("Potters") entered into a New Markets Tax Credit ("NMTC") financing arrangement with JPMorgan Chase Bank N.A. and several of its affiliates ("Chase") and TX CDE V LLC, an affiliate of Texas LIC Development Company LLC d/b/a Texas Community Development Capital ("TX CDE") to fund the expansion of Potters' manufacturing facility in Paris, Texas (the "NMTC Agreement"). The NMTC program, which is administered by the United States Treasury Department requires certain balance sheet commitments. The NMTC Agreement will provide the Company with certain monetary benefits as an offset to specifically identified capital expenditures. The NMTC Agreement requires that certain commitments and covenants be maintained over the course of the next 7 years, in order to legally recognize the benefit. Chase agreed to contribute \$6,634 and an additional \$15,632 in funds lent to Chase by Potters Holdings II, L.P. to TX CDE. TX CDE, in turn, lent \$21,000 in the form of \$5,368 and \$15,632 notes, or the Loans, to Potters, which used the proceeds of the Loans to finance the expansion of Potters' manufacturing facility in Paris, Texas. The capital expenditures associated with the NMTC Agreement were completed in 2014. The \$21,000 was outstanding as of December 31, 2015 and 2014.

In connection with the NMTC transaction, the Company has provided an indemnification related to our actions or inactions which cause either a NMTC disallowance or recapture event. In the event that we cause either a recapture or disallowance of the tax credits expected to be generated under this program, then we 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 our actions and inactions prior to September 6, 2020. The maximum potential amount of future payments under this indemnification is approximately \$12,600. The Company currently believe that the likelihood of us being required to make a payment under this indemnification is remote.

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The Company also has several note payable agreements denominated in Japanese Yen which currently enables the Company to borrow up to a total of 260,000 Japanese Yen, or \$2,158. Borrowings bear interest at either TIBOR (“Tokyo Interbank Offered Rate”) plus a margin or the short-term prime rate with a weighted average rate of 0.63% as of December 31, 2015 and as of December 31, 2014. The terms of the agreements vary and are renewable upon expiration of the term with the balances due in 2016. Borrowings under the agreement are payable at the option of the Company throughout the term of the agreements. Borrowings outstanding under these agreements were \$2,158 and \$2,184 as of December 31, 2015 and 2014, respectively.

Certain of the Company’s foreign subsidiaries maintain other note payable agreements. These agreements are not further described as they are not significant to the consolidated financial statements.

The fair value of a financial instrument is the amount at which the instrument could be exchanged in a current transaction. As of December 31, 2015 and 2014, the fair value of the senior secured term loan and senior secured bond was lower than book value by \$30,760 and \$3,206, respectively. The fair value of the senior secured term loans and notes were derived from published loan prices at December 31, 2015 and 2014, as applicable. The fair value is classified as Level 1 based upon the fair value hierarchy and is determined using unadjusted quoted prices in active markets for identical liabilities.

The aggregate long-term debt maturities are:

Year	Amount
2016	\$ 14,508
2017	1,185,600
2018	600,000
2019	—
2020	—
Thereafter	21,000
	<u>\$ 1,821,108</u>

Cash payments for interest were \$103,108, \$104,917, and \$109,337, for the years ended December 31, 2015, 2014, and 2013, respectively.

14. Other Long-term Liabilities:

The following table summarizes the components of other long-term liabilities as follows:

	December 31,	
	2015	2014
Pension benefits	\$ 58,725	\$ 61,028
Other postretirement benefits	4,566	5,116
Supplemental retirement plans	12,960	13,851
Reserve for uncertain tax positions	9,941	17,631
Asset retirement obligation	3,532	3,452
INEOS Group liability (see Note 20)	3,091	4,116
Natural gas hedge agreements	732	603
Other	3,318	4,213
Total	<u>\$ 96,865</u>	<u>\$ 110,010</u>

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15. 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.

Use of Derivative Financial Instruments to Manage Interest Rate Risk. The Company is exposed to fluctuations in interest rates on the long-term senior secured term loan and revolving credit facility. 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 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.

During 2013, the Company entered into interest rate cap agreements, paying a premium of \$995 to mitigate interest rate volatility from September 2013 until March 2016, by employing a 2% cap rates on \$800,000 of notional variable debt.

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The fair values of derivative instruments held are shown below:

	<u>Balance sheet location</u>	<u>December 31,</u>	
		<u>2015</u>	<u>2014</u>
Asset derivatives:			
Derivatives designated as cash flow hedges:			
Interest rate caps	Other long-term assets	—	\$ 49
Total asset derivatives		<u>\$ —</u>	<u>\$ 49</u>
Liability derivatives:			
Derivatives designated as cash flow hedges:			
Natural gas swaps	Accrued liabilities	\$3,004	\$3,205
Natural gas swaps	Other long-term liabilities	732	603
Derivatives not designated as cash flow hedges:			
Natural gas swaps	Accrued liabilities	<u>210</u>	<u>401</u>
Total liability derivatives		<u>\$3,946</u>	<u>\$4,209</u>

The following table shows the effect of the Company's derivative instruments designated as hedges on other comprehensive income (loss) (OCI) and the statement of income:

	<u>Location in Earnings</u>	<u>Year ended December 31,</u>		
		<u>2015</u>	<u>2014</u>	<u>2013</u>
Derivatives designated as cash flow hedges:				
AOCI derivative loss at beginning of year		\$(4,220)	\$ (202)	\$(2,966)
Effective portion of changes in fair value recognized in OCI:				
Interest rate caps		(49)	(900)	(47)
Natural gas swaps		(4,154)	(3,566)	839
Natural gas caps		—	174	(81)
Amount of loss reclassified from OCI to earnings:				
Interest rate caps	Interest expense	398	1,434	1,703
Natural gas swaps	Cost of goods sold	<u>4,226</u>	<u>(1,160)</u>	<u>350</u>
AOCI derivative loss at end of year		<u>\$(3,799)</u>	<u>\$(4,220)</u>	<u>\$ (202)</u>

Amounts of unrealized losses in OCI that are expected to be reclassified to the consolidated statement of operations over the next twelve months are \$3,004 as of December 31, 2015.

16. Income Taxes:

Income (loss) before income taxes and noncontrolling interest within or outside the United States are shown below:

	<u>December 31,</u>		
	<u>2015</u>	<u>2014</u>	<u>2013</u>
Domestic	\$(50,677)	\$(71,392)	\$(31,277)
Foreign	<u>83,201</u>	<u>77,223</u>	<u>70,136</u>
Total	<u>\$ 32,524</u>	<u>\$ 5,831</u>	<u>\$ 38,859</u>

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The provision (benefit) for income taxes as shown in the accompanying consolidated statements of operations consists of the following:

	December 31,		
	2015	2014	2013
Current:			
Federal	\$ 4	\$ (682)	\$ 1,136
State	303	317	(84)
Foreign	14,362	18,641	16,200
	<u>14,669</u>	<u>18,276</u>	<u>17,252</u>
Deferred:			
Federal	8,812	(9,686)	(1,795)
State	1,650	(1,175)	(2,291)
Foreign	(2,229)	133	(2,558)
	<u>8,233</u>	<u>(10,728)</u>	<u>(6,644)</u>
Provision (benefit) for income taxes	<u>\$22,902</u>	<u>\$ 7,548</u>	<u>\$ 10,608</u>

A reconciliation of income tax expense (benefit) at the U.S. federal statutory income tax rate of 35% to actual income tax expense (benefit) is as follows:

	December 31,		
	2015	2014	2013
Tax at statutory rate	\$ 11,383	\$ 2,041	\$ 13,600
State income taxes, net of federal income tax benefit	(2,760)	(2,011)	(2,858)
Repatriation of non-US earnings	22,869	5,919	10,011
Changes in uncertain tax positions	(1,919)	506	(732)
Change in valuation allowances	3,157	2,318	(1,816)
Change in state effective rates	214	(1,337)	308
Foreign withholding taxes	1,505	2,223	1,639
Foreign tax rate differential	(13,230)	(11,013)	(11,883)
Non-deductible transaction costs	322	6,782	—
Other, net	1,361	2,120	2,339
Provision (benefit) for income taxes	<u>\$ 22,902</u>	<u>\$ 7,548</u>	<u>\$ 10,608</u>

The total tax provision of \$22,902 for the twelve months ended December 31, 2015 on the Company's consolidated pre-tax income for the period differs from the U.S. statutory tax rate of 35% principally due to the repatriation of non-US earnings, foreign income tax in jurisdictions with statutory rates different than the U.S. rate, state taxes, non-deductible transaction costs, foreign withholding taxes, changes in valuation allowance, and changes in uncertain tax positions.

The total tax provision of \$7,548 for the twelve months ended December 31, 2014 on the Company's consolidated pre-tax income for the period differs from the U.S. statutory tax rate of 35% principally due to the repatriation of non-US earnings, foreign income tax in jurisdictions with statutory rates different than the U.S. rate, state taxes, non-deductible transaction costs, foreign withholding taxes, changes in valuation allowance, and changes in uncertain tax positions.

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The total tax provision of \$10,608 for the twelve months ended December 31, 2013 on the Company's consolidated pre-tax income for the period differs from the U.S. statutory tax rate of 35% principally due to the repatriation of non-US earnings, foreign income tax in jurisdictions with statutory rates different than the U.S. rate, state taxes, foreign withholding taxes, changes in valuation allowance, and changes in uncertain tax positions.

Deferred tax assets (liabilities) are comprised of the following:

	December 31,	
	2015	2014
Deferred tax assets:		
Net operating loss carryforwards	\$ 117,825	\$ 125,972
Pension	23,327	24,713
Postretirement health	1,451	1,601
Transaction costs	2,409	3,380
Natural gas contracts	1,421	1,447
Interest rate swaps	25	158
Unrealized translation losses	7,145	7,552
Other	26,556	19,873
Valuation allowance	(40,078)	(39,178)
	<u>\$ 140,081</u>	<u>\$ 145,518</u>
Deferred tax liabilities:		
Depreciation	\$ (42,962)	\$ (43,079)
Undistributed earnings of non-US subsidiaries	(49,767)	(43,317)
LIFO reserve	(4,981)	(5,089)
Intangible assets	(132,556)	(142,072)
Other accruals	(18,821)	(19,759)
	<u>\$ (249,087)</u>	<u>\$ (253,316)</u>
Net deferred tax liabilities	<u>\$ (109,006)</u>	<u>\$ (107,798)</u>

Included in the 2015 deferred tax asset and liability amounts for depreciation, intangible assets, LIFO reserve, natural gas contracts, and other above is \$42,451 of a net deferred tax liability related to the Company's investment in Potters Industries, LLC, which is a partnership for Federal income tax purposes. The Company and one of its subsidiaries own in aggregate 100% of Potters Industries, LLC and the assets and liabilities of Potters Industries, LLC are included in the consolidated financial statements of the Company.

The \$109,006 in net deferred tax liabilities as of December 31, 2015 consists of \$4,191 in net non-current deferred tax assets and \$113,197 in net non-current deferred tax liabilities.

The \$107,798 in net deferred tax liabilities as of December 31, 2014 consists of \$6,687 in non-current deferred tax assets and \$114,485 in net non-current deferred tax liabilities.

The change in net deferred tax assets (liabilities) for the year ended December 31, 2015 was primarily related to the increase in deferred tax assets on accrued pension obligations, and book amortization of intangibles with no corresponding tax basis.

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The change in net deferred tax assets (liabilities) for the year ended December 31, 2015 was primarily related to the increase in deferred tax liabilities on the undistributed earnings of non-US subsidiaries, partially offset by the book amortization of intangibles with no corresponding tax basis.

Following are changes in the deferred tax valuation allowance during the years ended December 31, 2015, 2014, and 2013:

	<u>Beginning Balance</u>	<u>Additions</u>	<u>Reductions</u>	<u>Ending Balance</u>
Year ended December 31, 2015	\$ 39,178	3,750	(2,850)	\$40,078
Year ended December 31, 2014	37,141	3,702	(1,665)	39,178
Year ended December 31, 2013	36,649	6,302	(5,810)	37,141

The net change in the total valuation allowance was an increase of \$900 in 2015. The valuation allowance at December 31, 2015 was primarily related to foreign and state net operating loss carryforwards and tax credits that, in the judgment of management, are not more likely than not to be realized. In assessing the realizability of deferred tax assets, management considered whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. Management considered the scheduled reversal of deferred tax liabilities (including the impact of available carryback and carryforward periods), projected future taxable income, and tax-planning strategies that are prudent in making this assessment. In order to fully realize deferred tax assets, the Company will need to generate future taxable income prior to the expiration of the net operating loss and credit carryforwards. The amount of the deferred tax assets considered realizable, however, could be reduced in the near term if estimates of future taxable income during the carryforward period are reduced.

Management considered certain earnings in non-U.S. subsidiaries to be available for repatriation in the future. The tax cost associated with non-U.S. subsidiary earnings and distributions for the years ended December 31, 2015 and 2014 has been recorded as tax expense for the period. In this regard the Company expects to deduct, rather than credit, foreign tax expense in computing the U.S. tax effects of repatriation from non-U.S. subsidiaries in 2015 and 2014. The unremitted earnings of non-U.S. subsidiaries and affiliates that have not been reinvested abroad indefinitely amount to \$129,139 as of December 31, 2015. The deferred U.S. federal and state income tax liability and deferred foreign withholding tax liability on these undistributed earnings is estimated to be \$49,767.

At December 31, 2015, the cumulative unremitted earnings of foreign subsidiaries outside the United States, considered permanently reinvested, for which no income or withholding taxes have been provided, approximated \$94,475. Such earnings are expected to be reinvested indefinitely and, as a result, no deferred tax liability has been recognized with regard to such earnings. Determination of the deferred income tax liability on these unremitted earnings is not practicable principally because such liability, if any, is dependent on circumstances existing if and when remittance occurs.

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The following table summarizes the activity related to our gross unrecognized tax benefits:

	December 31,	
	2015	2014
Balance at beginning of period	\$ 15,503	\$ 16,180
Increases related to prior year tax positions	8,271	163
Decreases related to prior year tax positions	(2,035)	(1,021)
Increases related to current year tax positions	768	740
Decreases related to settlements with taxing authorities	(3,033)	(270)
Decreases related to lapsing of statute of limitations	(55)	(289)
Balance at end of period	<u>\$ 19,419</u>	<u>\$ 15,503</u>

Included in the balance of total unrecognized tax benefits are potential benefits of \$19,419 and \$15,503, that if recognized, would affect the effective tax rate on income from continuing operations as of December 31, 2015 and 2014, respectively.

Interest and penalties recognized related to uncertain tax positions amounted to (\$1,313), \$976 and \$152 in 2015, 2014 and 2013, respectively. To the extent interest and penalties are not assessed with respect to uncertain tax positions, amounts accrued will be reduced and reflected as a reduction of the overall income tax provision in the period for which the event occurs requiring the adjustment. The accrued interest and penalties as of December 31, 2015 and 2014 are \$3,131 and \$5,843, respectively, and are recorded in other long-term liabilities in the consolidated balance sheet.

The Company files numerous consolidated and separate income tax returns in the U.S. Federal jurisdiction and in many state and foreign jurisdictions. The following describes the open tax years, by major tax jurisdiction, as of December 31, 2015:

<u>Jurisdiction</u>	<u>Period</u>
United States—Federal	2011 - Present
United States—State	2008 - Present
Canada (a)	2009 - Present
Germany	2010 - Present
Netherlands	2011 - Present
Mexico	2010 - Present
United Kingdom	2010 - Present
Brazil	2010 - Present

(a)—Includes federal as well as local jurisdictions

Given that the U.S. Company has net operating loss carryforwards, the statute for examination by taxing authorities in the United States, and certain state jurisdictions, will remain open for a period following the use of such net operating loss carryforwards extending the period for examination beyond the years indicated above.

The Company has subsidiaries in various states, provinces and countries that are currently under audit for years ranging from 2003 through 2015. To date, no material adjustments have been proposed as a result of these audits. As of December 31, 2015, the Company does not believe that there are any positions for which it is reasonably possible that the total amount of unrecognized tax benefits will significantly increase or decrease within the next 12 months.

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The Company has a net operating loss carry-forward (“NOL”) available of \$288,017 to reduce future federal taxes payable. The federal carry-forward period is 20 years. \$29,278 relates to periods prior to the 2007 Merger. \$258,559 relates to periods after the 2007 Merger but prior to the 2014 Stock Purchase. \$180 relates to periods after the 2014 Stock Purchase. Both, the 2007 Merger and 2014 Stock Purchase triggered the change in control provisions under IRC §382. Although subject to the limitations of IRC §382, management believes it is more likely than not that the Company will realize the entire \$287,837 in pre-transaction NOLs in future years. The remaining \$180 relates to NOLs generated following the 2014 Stock Purchase and would not be subject to IRC §382.

For state income tax purposes the Company incurred net operating losses of \$14,997 for 2015 that may be carried forward at periods ranging from 5 to 20 years among the states in which the Company is subject to tax to reduce future state income taxes payable. Cumulative state net operating losses carrying forward into 2016 are \$461,980. A valuation allowance of \$12,789 has been applied against the total \$18,511 of state net operating loss deferred tax assets, leaving losses of \$5,722 that have been recognized for financial accounting purposes for the portion of those losses that the Company believes, on a more likely than not basis, will be realized.

Foreign net operating losses of \$43,287, of which \$14,563 will begin to expire in 2029 and the remaining \$28,724 carried forward indefinitely, are available to reduce future foreign income taxes payable. A valuation allowance of \$10,046 has been applied to \$10,622 of deferred tax assets related to foreign net operating loss carry-forwards, leaving a net deferred tax asset relating to foreign net operating losses of \$576 that have been recognized for financial accounting purposes.

Cash payments (refunds) for income taxes are as follows:

	December 31,		
	2015	2014	2013
Domestic	\$ 143	\$ 1,248	\$ 366
Foreign	<u>20,047</u>	<u>15,918</u>	<u>14,019</u>
	<u>\$20,190</u>	<u>\$17,166</u>	<u>\$14,385</u>

17. Benefit Plans:

The Company sponsors defined benefit pension plans covering employees in the United States and Canada and certain employees at its subsidiaries outside of North America (“Other”). Benefits for a majority of the Plans are based on average final pay and years of service. The Company’s funding policy is to fund the minimum required contribution under local statutory requirements. The Company uses a December 31 measurement date for its defined benefit plans.

The Company sponsors unfunded plans to provide certain health care benefits to retired employees in the United States and Canada. These plans were closed to new retirees in the United States and Canada as of December 31, 2006. The plans pay a stated percentage of medical expenses reduced by deductibles and other coverage. The plans are unfunded and obligations are paid out of the Company’s operations.

The Company also has defined benefit supplementary retirement plans which provide benefits for certain U.S. employees in excess of qualified plan limitations. The obligations are paid out of the Company’s general assets, including assets held in a Rabbi trust, or restoration plan assets.

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Defined Benefit Plans

The following tables summarize changes in the benefit obligation, the plan assets and the funded status of our significant benefit plans as well as the components of net periodic benefit costs, including key assumptions.

	U.S. and Canada		Other	
	December 31,		December 31,	
	2015	2014	2015	2014
Change in benefit obligation:				
Benefit obligation at beginning of period	\$ 210,546	\$ 180,248	\$ 86,410	\$ 61,995
Service cost	—	—	3,269	2,708
Interest cost	7,797	8,149	2,490	3,271
Participant contributions	—	—	342	401
Plan amendments	—	—	(354)	—
Settlement	—	—	(102)	—
Benefits paid	(8,554)	(8,459)	(1,202)	(1,405)
Expenses paid	—	—	(214)	(216)
Plan combinations	—	—	—	9,929
Actuarial (gains) losses	(8,458)	32,291	(6,823)	19,374
Translation adjustment	(3,124)	(1,683)	(9,416)	(9,647)
Benefit obligation at end of the period	<u>\$ 198,207</u>	<u>\$ 210,546</u>	<u>\$ 74,400</u>	<u>\$ 86,410</u>
Change in plan assets:				
Fair value of plan assets at beginning of period	\$ 172,445	\$ 158,528	\$ 66,022	\$ 43,466
Actual return on plan assets	(2,925)	21,116	(623)	16,940
Employers contributions	289	2,745	3,224	3,269
Employee contributions	—	—	342	401
Plan settlements	—	—	(102)	—
Benefits paid	(8,554)	(8,459)	(1,202)	(1,405)
Expenses paid	—	—	(214)	(216)
Plan combinations	—	—	—	10,565
Translation adjustment	(2,811)	(1,485)	(7,286)	(6,998)
Fair value of plan assets at end of the period	<u>\$ 158,444</u>	<u>\$ 172,445</u>	<u>\$ 60,161</u>	<u>\$ 66,022</u>
Funded status of the plans (underfunded)	<u>\$ (39,763)</u>	<u>\$ (38,101)</u>	<u>\$ (14,239)</u>	<u>\$ (20,388)</u>

Amounts recognized in the consolidated balance sheets consist of:

	U.S. and Canada		Other	
	December 31,		December 31,	
	2015	2014	2015	2014
Noncurrent asset	\$ —	\$ —	\$ 4,174	\$ 2,066
Current liability	—	—	(300)	(429)
Noncurrent liability	(39,763)	(38,101)	(18,113)	(22,025)
Accumulated other comprehensive loss	(41,863)	(40,731)	(292)	(4,434)
Net amount recognized	<u>\$ (81,626)</u>	<u>\$ (78,832)</u>	<u>\$ (14,531)</u>	<u>\$ (24,822)</u>

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Amounts recognized in accumulated other comprehensive loss consist of:

	U.S. and Canada		Other	
	December 31,		December 31,	
	2015	2014	2015	2014
Prior service credit	\$ —	\$ —	\$ 1,655	\$ 1,619
Net gain (loss)	(66,584)	(63,940)	(2,954)	(8,365)
Gross amount recognized	(66,584)	(63,940)	(1,299)	(6,746)
Deferred income taxes	24,721	23,209	1,007	2,312
Net amount recognized	<u>\$(41,863)</u>	<u>\$(40,731)</u>	<u>\$ (292)</u>	<u>\$(4,434)</u>

Components of net periodic benefit cost consist of:

	U.S. and Canada			Other		
	December 31,			December 31,		
	2015	2014	2013	2015	2014	2013
Service cost	\$ —	\$ —	\$ —	\$ 3,269	\$ 2,708	\$ 2,713
Interest cost	7,797	8,149	7,156	2,490	3,271	2,843
Expected return on plan assets	(10,696)	(11,389)	(10,673)	(2,315)	(2,492)	(2,022)
Amortization of prior service cost	—	—	—	(151)	(151)	(171)
Amortization of net (gain) loss	1,835	1,181	2,226	484	155	348
Settlement loss recognized	—	—	—	3	—	—
Net periodic expense	<u>\$ (1,064)</u>	<u>\$ (2,059)</u>	<u>\$ (1,291)</u>	<u>\$ 3,780</u>	<u>\$ 3,491</u>	<u>\$ 3,711</u>

The estimated net actuarial loss (gain) for the pension plans that will be amortized from accumulated other comprehensive income into benefit cost in 2016 is \$1,926 in the Company's U.S. and Canada pension plans and \$275 for the Company's Other pension plans. The estimated prior service cost (credit) that will be amortized from accumulated other comprehensive income into benefit cost in 2016 is (\$149) for the Company's Other pension plans.

The total accumulated benefit obligation as of December 31, 2015 and 2014 for the U.S. and Canadian plans was \$196,087 and \$207,757, respectively. The total accumulated benefit obligation as of December 31, 2015 and 2014 for the Other pension plans was \$71,551 and \$82,290, respectively.

The following table presents selected information about the Company's pension plans with accumulated benefit obligations in excess of plan assets:

	U.S. and Canada		Other	
	December 31,		December 31,	
	2015	2014	2015	2014
Projected benefit obligation	\$ 182,522	\$ 191,187	\$ 48,334	\$ 57,319
Accumulated benefit obligation	182,522	191,187	45,599	53,587
Fair value of plan assets	143,887	155,454	29,920	34,865

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Significant weighted average assumptions used in determining the pension obligations include the following:

	<u>U.S. and Canada</u>		<u>Other</u>	
	<u>December 31,</u>		<u>December 31,</u>	
	<u>2015</u>	<u>2014</u>	<u>2015</u>	<u>2014</u>
Discount rate	4.20%	3.82%	3.60%	3.26%
Compensation increase	0.28%	0.34%	2.80%	2.81%

Significant weighted average assumptions used in determining net periodic benefit cost include the following:

	<u>U.S. and Canada</u>			<u>Other</u>		
	<u>December 31,</u>			<u>December 31,</u>		
	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>
Discount rate	3.82%	4.64%	3.67%	3.26%	4.69%	4.91%
Compensation increase	0.30%	0.34%	0.40%	2.81%	3.11%	3.53%
Long-term rate of return	6.45%	7.34%	7.34%	3.77%	4.59%	5.04%

The U.S. discount rates were determined by utilizing a yield curve model. The model develops a spot rate curve based on the yields available from a broad based universe of high quality corporate bonds. The discount rate is then set as the weighted average spot rate, using the plan's expected benefit cash flows as the weights.

The rate of compensation increase on the U.S. plan was zero for the years ended December 31, 2015, 2014, and 2013, as all future accruals were frozen in the United States as of December 31, 2006 in accordance with the plan amendment approved in 2005. The rate of compensation increase in determining the pension obligation on the Canadian plan was 3.50% and 3.75% for the year ended December 31, 2015 and 2014, respectively. The rate of compensation increase in determining the net periodic benefit cost on the Canadian plan was 3.75% for the years ended December 31, 2015, 2014 and 2013. In determining the expected return on plan assets, the Company considers the relative weighting of plan assets, the historical performance of total plan assets and individual asset classes, and expected future performance. In addition, the Company may consult with and consider the opinions of our external advisors in developing appropriate return benchmarks.

The investment objective for the U.S. plan is to generate returns sufficient to meet future obligations. The strategy to meet the objective includes generating attractive returns using higher returning assets such as equity securities and balancing risk using less volatile assets such as fixed income securities. The plan invests in an allocation of assets across the three broadly-defined financial asset categories of equity, fixed income and cash. The target allocations for plan assets are 45 percent equity securities and 55 percent fixed income investments.

Similar considerations are applied to the investment objectives of the non-US plans as well as the asset classes available in each location and any legal restrictions on plan investments.

The Company categorized plan assets into a Fair Value Hierarchy. The hierarchy consists of three levels 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 1 assets primarily include investments in

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publicly traded equity securities and mutual funds. These securities (or the underlying investments of the funds) are actively traded and valued using quoted prices for identical securities from the market exchanges.

- 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 2 assets primarily consist of fixed-income securities and comingled funds that are not actively traded or whose underlying investments are valued using observable marketplace inputs. The fair value of plan assets invested in fixed-income securities is generally determined using valuation models that use observable inputs such as interest rates, bond yields, low-volume market quotes and quoted prices for similar assets. Plan assets that are invested in comingled funds are valued using a unit price or net asset value (“NAV”) that is based on the underlying investments of the fund.
- 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. Level 3 assets include investments covered by insurance policies and real estate funds valued using significant un-observable inputs.

	Fair value measurements at December 31, 2015			
	Total	Level 1	Level 2	Level 3
Cash and cash equivalents	\$ 1,317	\$ 1,241	\$ 76	\$ —
Equity securities:				
U.S. investment funds	39,064	39,064	—	—
International investment funds	44,655	24,935	19,720	—
Fixed income securities:				
Government securities	20,308	—	20,308	—
Corporate bonds	4,859	—	4,859	—
Investment fund bonds	90,021	79,211	10,810	—
Other:				
Insurance policies	18,295	—	15,237	3,058
Total	\$ 218,519	\$ 144,451	\$ 71,010	\$ 3,058

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	Fair value measurements at December 31, 2014			
	Total	Level 1	Level 2	Level 3
Cash and cash equivalents	\$ 1,247	\$ 1,079	\$ 168	\$ —
Equity securities:				
U.S. investment funds	49,664	49,664	—	—
International investment funds	40,298	19,037	21,261	—
Fixed income securities:				
Government securities	17,277	—	17,277	—
Corporate bonds	4,132	—	4,132	—
Investment fund bonds	104,130	92,485	11,645	—
Other:				
Insurance policies	21,721	—	18,543	3,178
Total	<u>\$ 238,469</u>	<u>\$ 162,265</u>	<u>\$ 73,026</u>	<u>\$ 3,178</u>

The changes in the level 3 pension plan assets for the years ended December 31, 2015 and 2014 were as follows:

	Insurance policies
Balance at December 31, 2013	\$ 3,259
Actual return on plan assets	24
Benefits paid	(43)
Contributions	355
Exchange rate changes	(417)
Balance at December 31, 2014	3,178
Actual return on plan assets	(77)
Benefits paid	(36)
Contributions	317
Exchange rate changes	(324)
Balance at December 31, 2015	<u>\$ 3,058</u>

The Company expects to contribute \$244 to the U.S. and Canada pension plans and \$4,078 to the Other pension plans in 2016.

The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

Year	U.S. and Canada	Other
2016	\$10,888	\$ 1,404
2017	11,226	1,961
2018	11,806	1,704
2019	11,666	2,584
2020	11,885	2,255
Years 2021-2025	61,132	15,062

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Certain of the Company's foreign subsidiaries maintain other defined benefit plans that are consistent with statutory practices. These plans are not included in the disclosures above as they are not significant to the consolidated financial statements.

Supplemental Retirement Plans

The following tables summarize changes in the benefit obligation, the plan assets and the funded status of our defined benefit supplementary retirement plans as well as the components of net periodic benefit costs, including key assumptions.

	December 31,	
	2015	2014
Change in benefit obligation:		
Benefit obligation at beginning of period	\$ 15,018	\$ 13,447
Interest cost	529	556
Benefits paid	(1,179)	(1,239)
Actuarial (gain)/losses	(240)	2,254
Benefit obligation at end of period	<u>\$ 14,128</u>	<u>\$ 15,018</u>
Change in plan assets:		
Fair value of plan assets at beginning of period	\$ —	\$ —
Employers contributions	1,179	1,239
Benefits paid	(1,179)	(1,239)
Fair value of plan assets at end of period	<u>\$ —</u>	<u>\$ —</u>
Funded status of the plans (underfunded)	<u>\$ (14,128)</u>	<u>\$ (15,018)</u>

Amounts recognized in the consolidated balance sheets consist of:

	December 31,	
	2015	2014
Current liability	\$ (1,168)	\$ (1,167)
Noncurrent liability	(12,960)	(13,851)
Accumulated other comprehensive loss	<u>(3,519)</u>	<u>(3,822)</u>
Net amount recognized	<u>\$ (17,647)</u>	<u>\$ (18,840)</u>

Amounts recognized in accumulated other comprehensive loss consist of:

	December 31,	
	2015	2014
Net loss	\$(5,726)	\$(6,215)
Gross amount recognized	(5,726)	(6,215)
Deferred income taxes	2,207	2,393
Net amount recognized	<u>\$(3,519)</u>	<u>\$(3,822)</u>

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Components of net periodic benefit cost consist of:

	December 31,		
	2015	2014	2013
Interest cost	\$529	\$556	\$483
Amortization of net loss	248	150	198
Net periodic expense	<u>\$777</u>	<u>\$706</u>	<u>\$681</u>

The estimated net actuarial loss (gain) for the pension plans that will be amortized from accumulated other comprehensive loss into benefits cost in 2016 is \$216 for our defined benefit supplementary retirement plans.

The accumulated benefit obligation of our defined benefit supplemental retirement plans for the years ended December 31, 2015 and 2014 was \$14,128 and \$15,019, respectively.

The discount rate used in determining the supplemental retirement plan pension obligations was 4.00% and 3.60% for the years ended December 31, 2015 and 2014, respectively.

The discount rate used in determining net periodic benefit cost was 3.60%, 4.30%, and 3.30%, for the years ended December 31, 2015, 2014, and 2013, respectively. The rate of compensation increase for the fiscal years ended December 31, 2015, 2014, and 2013, was zero as all future accruals were frozen for the defined supplemental retirement plans as of December 31, 2006 in accordance with the plan amendment approved in 2005.

The Company expects to contribute \$1,168 to the defined benefit supplementary retirement plans in 2016.

The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

<u>Year</u>	<u>Amount</u>
2016	\$ 1,168
2017	1,143
2018	1,115
2019	1,085
2020	1,055
Years 2021-2025	4,816

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Other Postretirement Benefit Plans

The following tables summarize changes in the benefit obligation, the plan assets and the funded status of our other postretirement benefit plans as well as the components of net periodic benefit costs, including key assumptions.

	December 31,	
	2015	2014
Change in benefit obligation:		
Benefit obligation at beginning of period	\$ 5,586	\$ 6,352
Interest cost	172	201
Employee contributions	279	281
Benefits paid	(1,306)	(1,060)
Medical subsidies received	164	93
Premiums paid	(3)	(3)
Actuarial (gain)/losses	227	(153)
Translation adjustment	(218)	(125)
Benefit obligation at end of period	<u>\$ 4,901</u>	<u>\$ 5,586</u>
Change in plan assets:		
Fair value of plan assets at beginning of period	\$ —	\$ —
Employers contributions	866	689
Employee contributions	279	281
Benefits paid	(1,306)	(1,060)
Medical subsidies received	164	93
Premiums paid	(3)	(3)
Fair value of plan assets at end of period	<u>\$ —</u>	<u>\$ —</u>
Funded status of the plans (underfunded)	<u><u>\$ (4,901)</u></u>	<u><u>\$ (5,586)</u></u>

Amounts recognized in the consolidated balance sheets consist of:

	December 31,	
	2015	2014
Current liability	\$ (747)	\$ (888)
Noncurrent liability	(4,154)	(4,698)
Accumulated other comprehensive income	422	500
Net amount recognized	<u><u>\$ (4,479)</u></u>	<u><u>\$ (5,086)</u></u>

Amounts recognized in accumulated other comprehensive income consist of:

	December 31,	
	2015	2014
Net gain	<u>\$ 949</u>	<u>\$ 1,153</u>
Gross amount recognized	949	1,153
Deferred income taxes	(527)	(653)
Net amount recognized	<u><u>\$ 422</u></u>	<u><u>\$ 500</u></u>

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Components of net periodic benefit cost consist of:

	December 31,		
	2015	2014	2013
Interest cost	\$172	\$ 201	\$185
Amortization of net (gain) loss	(61)	(112)	(36)
Net periodic expense	<u>\$111</u>	<u>\$ 89</u>	<u>\$149</u>

The estimated net actuarial loss (gain) for the pension plans that will be amortized from accumulated other comprehensive income into benefits cost in 2016 is (\$51) for our retiree health plans.

Significant weighted average assumptions used in determining the net periodic benefit cost, the postretirement benefit obligations, and trend rate include the following:

	December 31,	
	2015	2014
Benefit obligation:		
Discount rate (benefit obligation)	3.64%	3.32%
Immediate trend rate	7.28%	7.52%
Ultimate trend rate	4.50%	4.50%
Year that the rate reaches ultimate trend rate	2035	2028

	December 31,		
	2015	2014	2013
Benefit cost:			
Discount rate (benefit cost)	3.32%	3.66%	2.79%
Immediate trend rate	7.52%	7.72%	7.87%
Ultimate trend rate	4.50%	4.50%	4.50%
Year that the rate reaches ultimate trend rate	2028	2028	2028

A 1% change in the assumed health care cost trend would have increased (decreased) the accumulated postretirement benefit obligation at December 31, 2015 and the periodic postretirement benefit cost for the year ended as follows:

	1% Increase	1% Decrease
Accumulated postretirement benefit obligation	262	(260)
Periodic postretirement benefit cost	9	(8)

The Company expects to contribute \$747 to the retiree health plans in 2016.

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The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

<u>Year</u>	<u>Amount</u>
2016	\$ 747
2017	719
2018	593
2019	528
2020	460
Years 2021-2025	1,188

There are no expected Medicare subsidy receipts expected in future periods.

Certain of the Company's foreign subsidiaries maintain other postretirement benefit plans that are consistent with statutory practices. These plans are not included in the disclosures above as they are not significant to the consolidated financial statements.

Defined Contribution Plans

The Company also has defined contribution plans covering domestic employees of the Company and certain subsidiaries. The Company recorded expenses of \$6,638, \$7,826, and \$8,713, related to these plans for the years ended December 31, 2015, 2014, and 2013, respectively.

18. Stock-Based Compensation:

The Company applies the fair value based method to account for stock options and awards.

On January 29, 2014, CPQ Holding Corporation changed its name to PQ Holdings Inc.

On September 28, 2007, the Company established the CPQ Holding Corporation Stock Incentive Plan, (the "Stock Incentive Plan"). On July 2, 2008, the Stock Incentive Plan was amended. The number of shares that may be issued under the amended Stock Incentive Plan or be subject to awards may not exceed 692,495 shares. In accordance with the Stock Incentive Plan, the Company has the authority to issue restricted stock, options, stock appreciation rights, deferred stock units, and dividends.

In 2007 and 2008, the Company issued 355,269 shares of restricted Class A common stock and 895 deferred stock units under the Stock Incentive Plan. In February 2010, the Company issued 340,981 additional shares of restricted Class A common stock under the Stock Incentive Plan, of which a portion of the shares were awarded to certain employees new to the Stock Incentive Plan and a portion of the shares were awarded to certain employees previously awarded shares in 2007 and 2008. The restricted stock includes three separate tranches for vesting purposes; (1) Service shares, (2) Tranche 1 Performance shares, and (3) Tranche 2 Performance shares. The Service shares' vesting is based on satisfying certain service conditions and the Tranche 1 and Tranche 2 shares' vesting is based on satisfying certain performance conditions. All of the Service shares vested on certain dates during 2007, 2008, 2009, 2010 and 2011, subject to the employees' continued service with the Company on such dates. In connection with the 2014 Stock Purchase, the vesting of Tranche 1 Performance shares was modified to provided that those shares will vest as follows: 100% of each grant fully vests on any Measurement Date, as defined in the amendment to the shareholder's restricted stock agreement, upon certain investment funds affiliated with CCMP having received Proceeds, as defined, resulting in an MOI, as defined, of at least 2.0,

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subject to the employee's continued service with the Company through the vesting date. "MOI" is defined, as of the Measurement Date, as the quotient obtained on or prior to such Measurement Date by dividing (i) the sum of Proceeds received on such Measurement Date and all prior Measurement Dates, by (ii) the Principal Investment. All of the Tranche 2 Performance shares vested when the Company met three specified annual EBITDA targets, subject to the employees' continued service with the Company on such dates when the EBITDA targets were met. The fair value of the awards was determined using multiples of EBITDA and the income approach, based on discounted free cash flow.

In 2015, the Company issued 57,923 shares of restricted Class D common stock and 34,628 shares of Class C options. Both share issuances have various vesting features, including satisfying certain service based and performance based conditions. The fair value of the Class D common stock awards was determined based on the equity valuation from recent transactions. The fair value of the Class C options was determined using a Black-Scholes option pricing model.

Activity of nonvested shares of restricted Class D common stock granted under the Company's Stock Incentive Plan is shown below. The weighted-average grant-date fair value of the restricted Class D common stock granted during 2015 was \$160.71.

	Number of shares		Weighted average grant date fair value (per share)	
	Class A	Class D	Class A	Class D
Nonvested awards, December 31, 2014	200,665	—	\$ 7.09	\$ —
Granted during year	—	57,923	\$ —	\$ 160.71
Vested during year	—	(2,225)	\$ —	\$ 160.71
Nonvested awards, December 31, 2015	200,665	55,698	\$ 7.09	\$ 160.71

Compensation expense for all stock-based awards was \$3,358, \$0, and \$1,011, for years ended December 31, 2015, 2014, and 2013, respectively, commensurate with the estimated vesting of the underlying awards.

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19. Common Stock:

As of December 31, 2015 and 2014, the Company has the following capital stock:

	December 31,	
	2015	2014
Class A common stock (Par value \$0.01):		
Authorized	150,000,000	150,000,000
Issued	680,678	680,678
Outstanding	582,280	582,593
Class B common stock (Par value \$0.01):		
Authorized	30,000,000	30,000,000
Issued	5,100,795	5,100,795
Outstanding	5,087,995	5,087,995
Class C common stock (Par value \$0.01):		
Authorized	10,000,000	10,000,000
Issued	48,820	48,820
Outstanding	48,820	48,820
Class D common stock (Par value \$0.01):		
Authorized	1,500,000	1,500,000
Issued	84,258	5,800
Outstanding	84,258	5,800
Preferred stock (Par value \$0.01):		
Authorized	1,500,000	1,500,000
Issued	—	—
Outstanding	—	—

In conjunction with the 2007 Merger, the Company received \$315,000 of capital. In connection with the 2008 INEOS Acquisition, the Company received an additional \$192,830 of capital. During 2009, the Company received an additional \$2,250 of capital.

The 2007 Merger was accounted for as a purchase in accordance with U.S. GAAP. As a result of a 6.6% continuing ownership interest in PQ Holdings Inc. by certain stockholders ("Continuing Stockholders"), 93.4% of the purchase price was allocated to the assets and liabilities acquired at their respective fair values with the remaining 6.6% recorded at the Continuing Stockholders' historical book values as of the date of the acquisition. As a result of the carryover of the Continuing Stockholders' historical basis, stockholders' equity (deficit) of PQ Holdings Inc. has been reduced by \$53,532.

In connection with the 2014 Stock Purchase, Class C and Class D shares were authorized and issued. Class C and Class D shares are identical to Class A and Class B shares, respectively, except they do not have voting rights.

20. 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

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

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. 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 will be required for contamination assessment and removal work 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. As of December 31, 2015 and 2014, the Company has recorded a reserve of \$1,625 and \$2,039 for costs required for contamination assessment and remediation work at these facilities. The amounts charged to pre-tax earnings for environmental remediation and related costs/(benefits) were \$0, \$(89), and \$1,500, for the years ended December 31, 2015, 2014, and 2013, respectively, and are recorded as other operation expense in the consolidated statements of operations. There may be additional costs related to soil and ground water remediation, 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 is preparing to abate painted surfaces that have tested positive for PCBs at levels exceeding 50 ppm in 2015. As of December 31, 2015 and 2014, the Company recorded a reserve of \$2,157 and \$2,644 for the anticipated remediation costs of known PCB painted structures at the Company's Baltimore and Chester facilities. The amounts charged to pre-tax earnings for remediation costs of known PCB painted structures were \$1,000 and \$2,935, for the years ended December 31, 2015 and 2014, respectively, and are recorded as other operation expense in the consolidated statements of operations.

In 2011, the Company installed a Continuous Emissions Monitor ("CEM") to measure CO, NOx and Opacity emissions from a furnace at our Chester facility in Pennsylvania. Since this time, the Company has conducted Relative Accuracy Test Audits ("RATA") as part of its efforts to certify the CEM. On May 5, 2014, 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 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. On January 8, 2015, the Environmental Program Manager for the Southeast Regional Office Air Quality Program of PADEP notified the Company that it would like to meet to discuss penalty calculations associated with CO and NOx emissions based on the CEM data. The penalty amount starting with fourth quarter 2011 through the second

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PQ HOLDINGS INC. AND SUBSIDIARIES
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(Dollars in thousands, except per share amounts)

quarter 2013 indicated in PADEP's communication to the Company totals to \$1,489. The Company is planning to meet with PADEP to propose significant reductions in the penalty amounts cited by the Agency. As of December 31, 2015 and 2014, the Company has recorded a reserve of \$1,700 and \$1,489, respectively, associated with the PADEP penalty and is recorded as other operation expense in the consolidated statements of operations.

As part of the 2008 INEOS Silicas Acquisition, the Company acquired 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 December 31, 2015 and 2014, the Company has recorded a reserve of \$639 and \$671, 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 some, but not all, of the alleged contamination. Respective legal counsel for the Company and the Port of Tacoma are currently engaged in efforts to negotiate the terms of a cost sharing agreement for the funding of additional study and subsequent abatement work to the extent necessary for the site. As of December 31, 2015 and 2014, the Company has recorded a reserve of \$707 and \$728, respectively, for costs related to this potential liability.

As part of the 2008 INEOS Silicas Acquisition, the Company is liable for potential multi-year UK tax benefits. The Company is contractually obligated to make a payment on an annual basis on its UK taxable results, which can fluctuate period to period, until there is a change in control, as defined in the purchase agreement. As of December 31, 2015 and 2014, the Company has accrued \$5,385 and \$6,457, respectively, for this matter representing the expected payment owed on the calculation of the liability for the tax year ended 2015 and 2014. The Company recorded these expenses as transaction related costs in other operating expense, net.

The Company has entered into various lease agreements for the rental of office and plant facilities and equipment, substantially all of which are classified as operating leases. Total rent expense under these agreements was \$14,551, \$13,476, and \$10,939, for the years ended December 31, 2015, 2014, and 2013, respectively.

Total rent due under non-cancelable operating lease commitments are:

<u>Year</u>	<u>Amount</u>
2016	\$10,659
2017	7,714
2018	4,398
2019	2,754
2020	1,905
Thereafter	3,964
	<u>\$31,394</u>

The Company rents its corporate office under a long-term operating lease agreement, which contains a provision for amid-term rent increase. The Company records monthly rent expense equal to the total of the payments due over the lease term, divided by the number of months of the lease term. The difference between rent expense recorded and the amount paid is credited or charged to deferred rent liability, which is reflected in the consolidated balance sheet.

PQ HOLDINGS INC. AND SUBSIDIARIES
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(Dollars in thousands, except per share amounts)

The Company has entered into short and long-term purchase commitments for various key raw materials and energy requirements. The purchase obligations include agreements to purchase goods that are enforceable and legally binding and that specify all significant terms. The purchase commitments covered by these agreements are with various suppliers and total approximately \$13,031.

Purchases under these agreements are expected to be:

<u>Year</u>	<u>Amount</u>
2016	\$ 6,108
2017	2,240
2018	1,130
2019	775
2020	775
Thereafter	<u>2,003</u>
	<u>\$13,031</u>

21. Related Party Transactions:

The Company maintains certain policies and procedures for the review, approval, and ratification of related party transactions to ensure that all transactions with selected parties are fair, reasonable and in the Company's best interest. All significant relationships and transactions are separately identified by management if they meet the definition of a related party or a related party transaction. Related party transactions include transactions that occurred during the year, or are currently proposed, in which the Company was or will be a participant and which any related person had or will have a direct or indirect material interest. All related party transactions are reviewed, approved and documented by the appropriate level of the Company's management in accordance with these policies and procedures.

PQ Holdings Inc., TC Group IV, L.L.C., an affiliate of The Carlyle Group, and PQ Corporation entered into a consulting agreement relating to the provision of certain financial and strategic advisory services and consulting services. The Company paid a one-time fee in the amount of \$12,000 on July 30, 2007 for structuring the 2007 Merger. In addition, the Company agreed to pay an annual monitoring fee equal to \$2,000. In conjunction with the 2008 INEOS Silicas Acquisition, the consulting agreement was amended whereby the Company agreed to increase the annual monitoring fee equal to \$3,000, which was recorded in other operating expense in the consolidated statements of operations for the years ended December 31, 2014 and 2013. TC Group IV, L.L.C. assigned the consulting agreement to Carlyle Investment Management L.L.C., another affiliate of The Carlyle Group on June 7, 2012.

PQ Holdings Inc., INEOS, and PQ Corporation entered into a consulting agreement relating to the provision of certain financial and strategic advisory services and consulting services. The Company paid a one-time fee in the amount of \$6,000 on July 2, 2008 for structuring the 2008 INEOS Silicas Acquisition. In addition, the Company agreed to pay an annual monitoring fee equal to \$2,000, which was recorded in other operating expense in the consolidated statements of operations for the years ended December 31, 2014 and 2013.

In conjunction with the 2014 Stock Purchase, PQ Holdings Inc., CCMP, and PQ Corporation entered into a consulting agreement relating to the provision of certain financial and strategic advisory services and consulting services. Similarly, the consulting agreement between PQ Holdings, INEOS, and PQ Corporation was amended and restated. Under the new consulting agreements, the Company agreed to pay an annual monitoring fee of

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

\$5,000 distributed to CCMP and INEOS equal to the Pro Rata Percentage, as defined, between CCMP and INEOS, which was recorded in other operating expense in the consolidated statements of operations for the year ended December 31, 2015.

The Company entered into a Joint Venture Agreement (the “ZI Partnership Agreement”) in 1988 with CRI Zeolites Inc., a Royal Dutch Shell plc affiliate, to form Zeolyst International, our 50/50 joint venture partnership (the “Partnership”). Under the terms of the ZI Partnership Agreement, the Partnership leases certain land used in its Kansas City production facilities from PQ Corporation. This lease, which has been recorded as an operating lease, provided for rental payments of \$265, \$250, and \$235 for the years ended December 31, 2015, 2014 and 2013, respectively. The terms of this lease are evergreen as long as the Partnership agreement is in place. The Partnership purchases certain of its raw materials from the Company and is charged for various manufacturing costs incurred at the Company’s Kansas City production facility. The amount of these costs charged to the Partnership during the years ended December 31, 2015, 2014, and 2013, were \$14,551, \$14,284, and \$13,044, respectively. Certain administrative, marketing, engineering, management-related, and research and development services are provided to the Partnership by the Company. During the years ended December 31, 2015, 2014, and 2013, the Partnership was charged \$12,551, \$10,164, and \$9,769, respectively, for these services. In addition, the Partnership was charged certain product demonstration costs of \$1,598, \$1,832, and \$1,970, during the years ended December 31, 2015, 2014, and 2013, respectively.

From time to time, the Company makes sales to portfolio companies of funds that are affiliated with CCMP and companies that are affiliated with INEOS, but these sales are not material.

22. Customer Concentration:

There were no single customers with revenue transactions greater than 10% of total revenues for the years ended December 31, 2015, 2014, and 2013.

23. Subsequent Events:

The Company has evaluated subsequent events from the balance sheet date through March 5, 2016, the date at which the financial statements were available to be issued, and determined there are no additional items to disclose.

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

	March 31, 2016	December 31, 2015
ASSETS		
Cash and cash equivalents	\$ 44,195	\$ 53,507
Receivables, net	137,706	117,438
Inventories	205,488	197,093
Prepaid and other current assets	19,550	19,006
Total current assets	406,939	387,044
Investments in affiliated companies	225,647	224,480
Property, plant and equipment, net	576,534	569,168
Goodwill	720,321	717,460
Other intangible assets, net	316,946	324,032
Other long-term assets	47,525	45,900
Total assets	<u>\$ 2,293,912</u>	<u>\$ 2,268,084</u>
LIABILITIES		
Notes payable and current maturities of long-term debt	\$ 31,661	\$ 14,508
Accounts payable	91,570	104,645
Accrued liabilities	81,588	73,497
Total current liabilities	204,819	192,650
Long-term debt	1,788,351	1,789,255
Deferred income taxes	119,594	113,197
Other long-term liabilities	95,147	96,865
Total liabilities	<u>2,207,911</u>	<u>2,191,967</u>
Commitments and contingencies (Note 13)		
EQUITY		
Common stock, Class A (\$0.01 par); authorized shares 150,000,000; issued shares 680,678; outstanding shares 581,798 and 582,280 on March 31, 2016 and December 31, 2015, respectively.	6	6
Common stock, Class B (\$0.01 par); authorized shares 30,000,000; issued shares 5,100,795; outstanding shares 5,087,995 on March 31, 2016 and December 31, 2015.	51	51
Common stock, Class C (\$0.01 par); authorized shares 10,000,000; issued shares 48,820; outstanding shares 48,820 on March 31, 2016 and December 31, 2015.	—	—
Common stock, Class D (\$0.01 par); authorized shares 1,500,000; issued shares 86,903 and 84,258; outstanding shares 28,560 on March 31, 2016 and December 31, 2015.	1	1
Additional paid-in capital	467,670	466,476
Accumulated deficit	(262,911)	(264,013)
Treasury stock, at cost; shares 98,880 and 98,398 (Class A), 12,800 (Class B), 0 (Class C), 0 (Class D) on March 31, 2016 and December 31, 2015, respectively.	(916)	(916)
Accumulated other comprehensive loss	(124,799)	(131,973)
Total PQ Holdings Inc. equity	79,102	69,632
Noncontrolling interest	6,899	6,485
Total equity	<u>86,001</u>	<u>76,117</u>
Total liabilities and equity	<u>\$ 2,293,912</u>	<u>\$ 2,268,084</u>

See accompanying notes to condensed consolidated financial statements.

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PQ HOLDINGS INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands)
(unaudited)

	Three months ended	
	March 31,	
	2016	2015
Sales	\$ 237,393	\$ 245,291
Cost of goods sold	173,613	180,528
Gross profit	63,780	64,763
Selling, general and administrative expenses	28,524	27,683
Other operating expense, net	11,461	15,193
Operating income	23,795	21,887
Equity in net income from affiliated companies	4,659	7,559
Interest expense	26,413	26,914
Other (income) expense, net	(3,422)	18,071
Income (loss) before income taxes and noncontrolling interest	5,463	(15,539)
Provision (benefit) for income taxes	3,904	(1,817)
Net income (loss)	1,559	(13,722)
Less: Net income attributable to the noncontrolling interest	457	505
Net income (loss) attributable to PQ Holdings Inc.	\$ 1,102	\$ (14,227)

See accompanying notes to condensed consolidated financial statements.

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

	Three months ended	
	March 31,	
	2016	2015
Net income (loss)	\$1,559	\$(13,722)
Other comprehensive income (loss), net of tax:		
Pension and postretirement benefits	363	397
Net gain (loss) from hedging activities	58	(191)
Foreign currency translation	6,710	(20,347)
Total other comprehensive income (loss)	7,131	(20,141)
Comprehensive income (loss)	8,690	(33,863)
Less: Comprehensive income attributable to noncontrolling interests	414	318
Comprehensive income (loss) attributable to PQ Holdings Inc.	<u>\$8,276</u>	<u>\$(34,181)</u>

See accompanying notes to condensed consolidated financial statements.

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

	Common stock, Class A	Common stock, Class B	Common stock, Class C	Common stock, Class D	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Noncontrolling interest	Total
Balance, December 31, 2015	\$ 6	\$ 51	\$ —	\$ 1	\$466,476	\$ (264,013)	\$ (916)	\$ (131,973)	\$ 6,485	\$76,117
Net income	—	—	—	—	—	1,102	—	—	457	1,559
Other comprehensive income (loss)	—	—	—	—	—	—	—	7,174	(43)	7,131
Stock compensation for restricted stock awards	—	—	—	—	1,194	—	—	—	—	1,194
Balance, March 31, 2016	<u>\$ 6</u>	<u>\$ 51</u>	<u>\$ —</u>	<u>\$ 1</u>	<u>\$467,670</u>	<u>\$ (262,911)</u>	<u>\$ (916)</u>	<u>\$ (124,799)</u>	<u>\$ 6,899</u>	<u>\$86,001</u>

	Common stock, Class A	Common stock, Class B	Common stock, Class C	Common stock, Class D	Additional paid-in capital	Accumulated deficit	Treasury stock, at cost	Accumulated other comprehensive income (loss)	Noncontrolling interest	Total
Balance, December 31, 2014	\$ 6	\$ 51	\$ —	\$ —	\$459,819	\$ (271,864)	\$ (916)	\$ (96,637)	\$ 7,089	\$ 97,548
Net income (loss)	—	—	—	—	—	(14,227)	—	—	505	(13,722)
Other comprehensive income (loss)	—	—	—	—	—	—	—	(19,954)	(187)	(20,141)
Dividend distribution	—	—	—	—	—	—	—	—	(153)	(153)
Balance, March 31, 2015	<u>\$ 6</u>	<u>\$ 51</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$459,819</u>	<u>\$ (286,091)</u>	<u>\$ (916)</u>	<u>\$ (116,591)</u>	<u>\$ 7,254</u>	<u>\$ 63,532</u>

See accompanying notes to condensed consolidated financial statements.

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

	Three months ended March 31,	
	2016	2015
Cash flows from operating activities:		
Net income (loss)	\$ 1,559	\$ (13,722)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:		
Depreciation	16,077	14,877
Amortization	7,544	7,638
Amortization of deferred financing costs and original issue discount	2,183	2,184
Hedge premium amortization	66	99
Foreign currency exchange (gain) loss	(3,206)	18,204
Pension and postretirement healthcare benefit expense	1,157	923
Pension and postretirement healthcare benefit funding	(2,124)	(2,687)
Deferred income tax provision (benefit)	2,590	(3,327)
Net (gain) loss on asset disposals	301	(25)
Supplemental pension plan mark-to-market loss gain	(304)	(182)
Stock compensation	1,194	—
Equity in net income from affiliated companies	(4,659)	(7,559)
Dividends received from affiliated companies	5,000	—
Working capital changes that provided (used) cash:		
Receivables	(17,976)	(21,939)
Inventories	(6,225)	(13,326)
Prepays and other current assets	(541)	(1,371)
Accounts payable	(1,919)	3,838
Accrued liabilities	5,655	4,954
Other, net	(143)	(452)
Net cash provided by (used in) operating activities	6,229	(11,873)
Cash flows from investing activities:		
Purchases of property, plant and equipment	(29,503)	(21,723)
Other, net	(2)	(36)
Net cash used in investing activities	(29,505)	(21,759)
Cash flows from financing activities:		
Draw down of revolver	42,000	—
Repayments of revolver	(25,000)	—
Repayments of long-term debt	(3,088)	(3,087)
Distributions to noncontrolling interests	—	(153)
Net cash provided by (used in) financing activities	13,912	(3,240)
Effect of exchange rate changes on cash	52	(3,562)
Net change in cash and cash equivalents	(9,312)	(40,434)
Cash and cash equivalents at beginning of period	53,507	100,836
Cash and cash equivalents at end of period	\$ 44,195	\$ 60,402
Non-cash investing activity:		
Capital expenditures acquired on account but unpaid as of the period end	\$ 9,256	\$ 9,149

See accompanying notes to condensed consolidated financial statements.

PQ HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands)
(unaudited)

1. Background and Basis of Presentation:

PQ Holdings Inc. and subsidiaries (the “Company”) conducts operations through three principal businesses: Performance 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; Catalysts: an integrated silica catalyst and specialty zeolite-based catalyst producer with leading global market positions, producing silica catalyst used in the production of high-density polyethylene (“HDPE”), and specialty zeolite-based catalysts sold to the emissions control industry, the petrochemical industry and other areas of the broader chemicals industry; and Specialty Glass Materials: a leading global producer of engineered glass products for use in highway safety, polymer additives, metal finishing and electronics end markets, which is comprised of Highway Safety and Engineered Glass Materials (“EGM”). Highway Safety manufactures glass beads used for airport, highway and road safety applications to improve visibility in wet and nighttime driving conditions, where EGM produces solid and hollow glass spheres for use as polymer additives and fillers in specialized plastics, as engineered peening beads in metal finishing and as conductives in consumer electronics and other applications.

The Company experiences some seasonality, primarily with respect to the Specialty Glass Materials business. As the road striping season occurs during warmer weather, sales and earnings are generated primarily during the second and third quarters. Working capital is built during the first and second quarters of the year, while cash generation occurs primarily in the second half of the fiscal year.

The condensed consolidated financial statements included herein are unaudited and have been prepared in accordance with accounting principles generally accepted in the United States (“GAAP”) for interim financial reporting. 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 year-end condensed consolidated balance sheet data was derived from audited financial statements, but does not include all disclosures required by GAAP. 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 notes thereto for the year ended December 31, 2015. The Company has continued to follow the accounting policies set forth in those consolidated statements.

2. Recently Issued Accounting Standards:

In March 2016, the Financial Accounting Standards Board (“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. The guidance is effective for public entities for annual periods beginning after December 15, 2016, and interim periods within those years, with early application permitted. 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 but will recognize expenses similar to current lease accounting. The guidance is effective for public companies for fiscal years, and interim periods

PQ HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in thousands)
(unaudited)

within those fiscal years, beginning after December 15, 2018. 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.

In September 2015, the FASB issued guidance that will change the requirements for reporting measurement period adjustments to provisional amounts initially recognized in conjunction with a business combination. Under GAAP, an acquiring entity currently is required to retrospectively adjust, in prior period financial statements, the provisional amounts to reflect new information obtained during the measurement period (a period, which may not exceed one year from the date of the business combination, during which the acquiring entity may receive information about the facts and circumstances existing as of the acquisition date that, if known, would have affected the measurement of the amounts recognized as of the acquisition date). Under the new guidance, adjustments to the provisional amounts will be reflected in the financial statements for the reporting period in which the adjustments are determined, including by recognizing in current period earnings the full effect of changes in depreciation, amortization or other income effects. The guidance requires that the acquiring entity either present separately on the face of the current period income statement or disclose in the notes to the current period financial statement, by line item, the amount of the adjustments made during the current period. The Company adopted the new guidance effective January 1, 2016. The Company will apply the adjustments prescribed by the guidance prospectively to new acquisitions. The guidance had no impact upon adoption on the Company's consolidated financial statements.

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 last-in, first-out ("LIFO") or the retail inventory method; rather, the amendments apply to all other inventory, which includes inventory that is measured using first-in, first-out ("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 new guidance will be effective for public entities for fiscal years beginning after December 15, 2016, including interim periods within those years. The Company does not expect this guidance to have a significant impact on its consolidated financial statements.

In August 2014, the FASB issued guidance regarding management's responsibility to evaluate whether there is substantial doubt about an entity's ability to continue as a going concern within one year of the issuance of the financial statements. If substantial doubt exists, additional disclosures would be required. This guidance will be effective starting with the annual period ending after December 15, 2016, with early adoption permitted. The Company does not expect this guidance to have a significant impact on its consolidated financial statements.

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

PQ HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
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uncertainty of revenues and cash flows from contracts with customers. The enhanced disclosures include qualitative and quantitative information about contracts with customers, significant judgments made in applying the revenue guidance, and assets recognized related to the costs to obtain or fulfill a contract. These new requirements for public entities become effective for annual reporting periods beginning after December 15, 2017, including interim periods within those years. The Company is assessing the impact of these new requirements on its financial statements.

3. Fair Value Measurements:

Fair values are based on quoted market prices when available. When market prices are not available, fair value is 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 value 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 which 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.

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The following table presents information about the Company's assets and liabilities that are measured at fair value on a recurring basis as of March 31, 2016 and December 31, 2015, and indicates the fair value hierarchy of the valuation techniques the Company utilized to determine such fair value. Financial assets and liabilities measured at fair value on a recurring basis are summarized as follows:

	As of March 31, 2016	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Restoration plan assets	\$ 5,987	\$ 5,987	\$ —	\$ —
Total	\$ 5,987	\$ 5,987	\$ —	\$ —
Liabilities:				
Derivative contracts	\$ 3,918	\$ —	\$ 3,918	\$ —
Total	\$ 3,918	\$ —	\$ 3,918	\$ —
	As of December 31, 2015	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Restoration plan assets	\$ 5,927	\$ 5,927	\$ —	\$ —
Total	\$ 5,927	\$ 5,927	\$ —	\$ —
Liabilities:				
Derivative contracts	\$ 3,946	\$ —	\$ 3,946	\$ —
Total	\$ 3,946	\$ —	\$ 3,946	\$ —

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 12 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

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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 Holdings Inc. 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 March 31, 2016 and December 31, 2015, the credit valuation adjustment resulted in a minimal change in the fair value of the derivatives.

4. Accumulated Other Comprehensive Loss:

The following table presents the tax effects of each component of other comprehensive income (loss) for the three months ended March 31, 2016 and 2015:

	Three months ended March 31,					
	2016			2015		
	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 gains	\$ 591	\$ (200)	\$ 391	\$ 625	\$ (202)	\$ 423
Unrecognized prior service costs	(37)	9	(28)	(35)	9	(26)
Benefit plans, net	554	(191)	363	590	(193)	397
Net gain (loss) from hedging activities	84	(26)	58	(309)	118	(191)
Foreign currency translation	4,005	2,705	6,710	(17,959)	(2,388)	(20,347)
Other comprehensive income (loss)	<u>\$ 4,643</u>	<u>\$ 2,488</u>	<u>\$ 7,131</u>	<u>\$ (17,678)</u>	<u>\$ (2,463)</u>	<u>\$ (20,141)</u>

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The following table presents the change in accumulated other comprehensive loss, net of tax, by component for the three months ended March 31, 2016 and 2015:

	Defined benefit and other postretirement plans	Net gain (loss) from hedging activities	Foreign currency translation	Total
December 31, 2015	\$ (48,206)	\$ (2,624)	\$ (81,143)	\$(131,973)
Other comprehensive income (loss) before reclassifications	1,814	795	6,753	9,362
Amounts reclassified from accumulated other comprehensive income (loss) ^(a)	(1,451)	(737)	—	(2,188)
Net current period other comprehensive income (loss) attributable to PQ Holdings Inc.	363	58	6,753	7,174
March 31, 2016	<u>\$ (47,843)</u>	<u>\$ (2,566)</u>	<u>\$ (74,390)</u>	<u>\$(124,799)</u>
December 31, 2014	\$ (49,982)	\$ (2,881)	\$ (43,774)	\$ (96,637)
Other comprehensive income (loss) before reclassifications	1,983	423	(20,160)	(17,754)
Amounts reclassified from accumulated other comprehensive income (loss) ^(a)	(1,586)	(614)	—	(2,200)
Net current period other comprehensive income (loss) attributable to PQ Holdings Inc.	397	(191)	(20,160)	(19,954)
March 31, 2015	<u>\$ (49,585)</u>	<u>\$ (3,072)</u>	<u>\$ (63,934)</u>	<u>\$(116,591)</u>

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

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The following table presents the reclassifications out of accumulated other comprehensive loss for the three months ended March 31, 2016 and 2015. Amounts in parenthesis indicate debits to profit / loss.

<u>Details about Accumulated Other Comprehensive Income Components</u>	<u>Amount Reclassified from Accumulated Other Comprehensive Income</u>		<u>Affected Line Item in the Statement Where Net Income is Presented</u>
	<u>Three months ended</u>		
	<u>2016</u>	<u>2015</u>	
Defined benefit and other postretirement plans			
Amortization of prior service cost	\$ 149	\$ 138	(a)
Amortization of net loss	(2,365)	(2,494)	(a)
	(2,216)	(2,356)	Total before tax
	765	770	Tax benefit
	<u>\$ (1,451)</u>	<u>\$ (1,586)</u>	Net of tax
Net gain (loss) from hedging activities			
Interest rate caps	\$ (66)	\$ (100)	Interest expense
Natural gas swaps	(1,002)	(893)	Cost of goods sold
	(1,068)	(993)	Total before tax
	331	379	Tax benefit
	<u>\$ (737)</u>	<u>\$ (614)</u>	Net of tax
Total reclassifications for the period	<u>\$ (2,188)</u>	<u>\$ (2,200)</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 12 for additional details).

5. Other Operating and Non-operating Expense, Net:

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

	<u>Three months ended</u>	
	<u>March 31,</u>	
	<u>2016</u>	<u>2015</u>
Amortization expense	\$ 7,544	\$ 7,638
Transaction related costs	288	6,039
Management advisory fee	1,250	1,250
Environmental related costs	385	42
Restructuring, plant closure and severance related costs	1,314	—
Net loss (gain) on asset disposals	301	(25)
Asset retirement obligation accretion	78	76
Other, net	301	173
	<u>\$ 11,461</u>	<u>\$ 15,193</u>

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The majority of the Company's other (income) expense, net consisted of a foreign exchange gain of (\$3,206) for the three months ended March 31, 2016 and a foreign exchange loss of \$18,204 for the three months ended March 31, 2015. These gains and losses are primarily driven by non-permanent intercompany debt arrangements denominated in local currencies which are translated to U.S. dollars.

6. Inventories:

Inventories were classified and valued as follows:

	March 31, 2016	December 31, 2015
Finished products and work in process	\$ 159,621	\$ 149,723
Raw materials	45,867	47,370
	<u>\$ 205,488</u>	<u>\$ 197,093</u>
Valued at lower of cost or market:		
LIFO basis	\$ 121,114	\$ 115,654
FIFO or average cost basis	84,374	81,439
	<u>\$ 205,488</u>	<u>\$ 197,093</u>

7. 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 March 31, 2016 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 March 31,	
	2016	2015
Net sales	\$60,621	\$ 71,338
Gross profit	19,120	25,662
Operating income	9,847	17,062
Net income (before taxes)	10,513	16,314

The Company's investment in affiliates balance as of March 31, 2016 and December 31, 2015 includes net purchase accounting fair value adjustments of \$65,610 and \$66,207, respectively, consisting primarily of intangible assets such as customer relationships, formulations and product technology, and tradenames. Consolidated equity in net income from affiliates is net of \$597 of amortization expense related to purchase accounting fair value adjustments for each of the three-month periods ended March 31, 2016 and 2015.

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8. Property, Plant and Equipment:

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

	March 31, 2016	December 31, 2015
Land	\$ 77,810	\$ 77,239
Buildings	181,500	177,723
Machinery and equipment	612,102	600,682
Construction in progress	126,644	115,336
	<u>998,056</u>	<u>970,980</u>
Less: accumulated depreciation	(421,522)	(401,812)
	<u>\$ 576,534</u>	<u>\$ 569,168</u>

Depreciation expense was \$16,077 and \$14,877 for the three months ended March 31, 2016 and 2015, respectively.

9. Long-term Debt:

The summary of long-term debt is as follows:

	March 31, 2016	December 31, 2015
Senior secured term loans with interest at 4.00% as of March 31, 2016 and as of December 31, 2015 (due August 2017)	\$ 1,194,863	\$ 1,197,950
Senior secured notes with interest at 8.75% as of March 31, 2016 and as of December 31, 2015 (due November 2018)	600,000	600,000
Revolving credit facility with interest at 4.93% as of March 31, 2016 (due May 2017)	17,000	—
Other	23,310	23,158
Total debt	1,835,173	1,821,108
Original issue discount	(11,411)	(13,117)
Deferred financing costs	(3,750)	(4,228)
Total debt, net of original issue discount	1,820,012	1,803,763
Less: current portion	(31,661)	(14,508)
	<u>\$ 1,788,351</u>	<u>\$ 1,789,255</u>

The fair value of a financial instrument is the amount at which the instrument could be exchanged in a current transaction. As of March 31, 2016 and December 31, 2015, the fair value of the senior secured term loans and senior secured notes was lower than book value by \$53,688 and \$30,760, respectively. The fair value of the senior secured term loans and notes was derived from published loan prices at March 31, 2016 and December 31, 2015, 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).

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10. 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 and cap 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 derivative liabilities are recorded in accrued liabilities and other long-term liabilities, and the respective current and non-current derivative 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.

Use of Derivative Financial Instruments to Manage Interest Rate Risk. The Company is exposed to fluctuations in interest rates on the long-term senior secured term loans and revolving credit facility. Changes in interest rates will not affect the market value of such debt but will affect the amount of our interest payments over the terms of the loans. Likewise, an increase in interest rates could have a material impact on the Company's cash flow. The Company hedges the interest rate fluctuations on these debt obligations through interest rate cap agreements. The Company records these agreements at fair value as assets or liabilities. 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. 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. Amounts accumulated in other comprehensive income related to interest rate cap agreements are reclassified to interest expense in the consolidated statements of operations when the related interest payments affect earnings. The Company had an \$800,000 notional amount of 2% interest rate caps on its variable-rate debt at December 31, 2015, with a fair value of zero. The agreements expired during March 2016, and the Company had no interest rate cap agreements outstanding at March 31, 2016.

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The fair values of derivative instruments held are shown below:

	Balance sheet location	March 31, 2016	December 31, 2015
Liability derivatives:			
Derivatives designated as cash flow hedges:			
Natural gas swaps	Accrued liabilities	\$ 3,113	\$ 3,004
Natural gas swaps	Other long-term liabilities	605	732
Derivatives not designated as cash flow hedges:			
Natural gas swaps	Accrued liabilities	200	210
Total liability derivatives		<u>\$ 3,918</u>	<u>\$ 3,946</u>

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:

		Three months ended March 31,			
		2016		2015	
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	\$ —	\$ 66	\$ (38)	\$ 100
Natural gas swaps	Cost of goods sold	(984)	1,002	(1,264)	893
		<u>\$ (984)</u>	<u>\$ 1,068</u>	<u>\$ (1,302)</u>	<u>\$ 993</u>

Amounts of unrealized losses in OCI that are expected to be reclassified to the consolidated statement of operations over the next twelve months are \$3,113 as of March 31, 2016.

11. Income Taxes:

The effective income tax rate for the three-month period ended March 31, 2016 was 71.5% compared to 11.7% for the three-month period ended March 31, 2015. The Company's effective income tax rate fluctuates based on, among other factors, changes in income mix. The difference between the U.S. federal statutory income tax rate and our effective income tax rate for the three months ended March 31, 2016 and 2015 was mainly due to the tax effect of repatriating foreign earnings back to the United States as dividends, differences between tax rates in foreign jurisdictions as compared to the U.S. tax rate, non-deductible transaction costs, withholdings taxes, changes to reserves for uncertain tax positions and changes in valuation allowances against deferred tax assets in certain jurisdictions.

12. Benefit Plans:

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

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Components of net periodic expense are as follows:

	Three months ended March 31,	
	2016	2015
Pension Benefits - U.S. and Canada		
Interest cost	\$ 2,026	\$ 1,949
Expected return on assets	(2,473)	(2,683)
Amortization of net loss	482	444
Net periodic expense (benefit)	<u>\$ 35</u>	<u>\$ (290)</u>
	Three months ended March 31,	
	2016	2015
Pension Benefits - Other Plans		
Service cost	\$ 779	\$ 841
Interest cost	716	654
Expected return on assets	(639)	(601)
Amortization of prior service cost	(38)	(32)
Amortization of net loss	78	126
Net periodic expense	<u>\$ 896</u>	<u>\$ 988</u>
	Three months ended March 31,	
	2016	2015
Supplemental Retirement Plans		
Interest cost	\$ 135	\$ 130
Amortization of net loss	54	56
Net periodic expense	<u>\$ 189</u>	<u>\$ 186</u>
	Three months ended March 31,	
	2016	2015
Other Postretirement Benefit Plans		
Interest cost	\$ 42	\$ 42
Amortization of net gain	(13)	(16)
Net periodic expense	<u>\$ 29</u>	<u>\$ 26</u>
	Three months ended March 31,	
	2016	2015
Contributions		
Pension Benefits - U.S. and Canada	\$ 105	\$ 47
Pension Benefits - Other Plans	1,904	2,328
Supplemental Retirement Plans	51	56
Other Postretirement Benefit Plans	64	256

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Certain of the Company's foreign subsidiaries maintain other defined benefit pension and postretirement plans that are consistent with statutory practices. These plans are not included in the disclosures above as they are not significant to the Company's condensed consolidated financial statements.

13. 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. 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 will be required for contamination assessment and removal work 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. As of March 31, 2016, the Company has recorded a reserve of \$1,250 for costs required for contamination assessment and removal work at these facilities. There may be additional costs related to the remediation of these two facilities, 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 required Pollutant Minimization Plan, 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, 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, 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. As of March 31, 2016, the Company has recorded a reserve of \$2,130 for the anticipated remediation costs of known PCB painted structures at the Company's Baltimore and Chester facilities.

In 2011, the Company installed a Continuous Emissions Monitor ("CEM") to measure CO, NOx and Opacity emissions from a furnace at our 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

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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 PADEP'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, the 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 is planning to meet with the PADEP to propose significant reductions in the penalty amounts cited by the Agency. As of March 31, 2016, the Company has recorded a reserve of \$1,700 associated with the PADEP penalty.

As part of the INEOS Silicas acquisition in July 2008, the Company acquired a manufacturing facility at Warrington, United Kingdom ("UK"). Asbestos-containing building material is present at the site, and asbestos removal and insulation replacement initiatives are underway. As of March 31, 2016, the Company has recorded a reserve of \$619 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 some, but not all, of the alleged contamination. As of March 31, 2016, the Company has recorded a reserve of \$707 for costs related to this potential liability.

As part of the INEOS Silicas acquisition in July 2008, the Company is liable for potential multi-year UK tax benefits. The Company is contractually obligated to make a payment on an annual basis on its UK taxable results, which can fluctuate period to period, until there is a change in control, as defined in the purchase agreement. The Company made its most recent annual payment for the tax year ended 2014 during the three months ended March 31, 2016. As of March 31, 2016, the Company has accrued \$3,000 for this matter representing the expected payment owed on the calculation of the liability for the tax years ended 2016 and 2015. The Company records these expenses as transaction related costs in other operating expense, net.

14. Subsequent Events:

On May 4, 2016, the Company announced the closing of the merger of Eco Services Holdings LLC ("*Eco Services*"), the Company and certain of their respective affiliates pursuant to which the Company and Eco Services will reorganize under a newly formed holding company (the "*Combined Company*") in an equity-for-equity transaction. The Combined Company will retain the PQ Corporation name, and the merger creates a leading global producer of inorganic specialty materials and catalysts positioned to deliver exceptional service and sustainable and innovative products to its customers.

Concurrently with the closing of the merger between the Company and Eco Services, the Company has also refinanced its existing credit facilities by entering into a \$1,200,000 senior secured term loan (consisting of a \$900,000 senior secured term loan and a \$300,000 Euro equivalent senior secured term loan), \$625,000 in new senior secured notes, \$525,000 in senior unsecured notes, and a \$200,000 asset-based secured revolving credit facility. The existing \$200,000 of Eco Services notes will remain outstanding.

The Company has evaluated subsequent events from the balance sheet date through May 11, 2016, the date at which the financial statements were available to be issued, and determined there are no additional items to disclose.

Report of Independent Auditors

To the Management Committee of Zeolyst International:

We have audited the accompanying financial statements of Zeolyst International (the “Partnership”), which comprise the balance sheets as of December 31, 2016 and 2015, and the related statements of operations and accumulated earnings, changes in partners’ capital, and cash flows for the three years in the period ended December 31, 2016.

Management’s Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor’s Responsibility

Our responsibility is to express an opinion on the financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the Partnership’s preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Partnership’s internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Zeolyst International at December 31, 2016 and 2015, and the results of its operations and its cash flows for the three years in the period ended December 31, 2016 in accordance with accounting principles generally accepted in the United States of America.

Emphasis of Matter

As discussed in Note 13 to the financial statements, the Partnership has significant related party transactions. Our opinion is not modified with respect to this matter.

/s/ PricewaterhouseCoopers LLP
Philadelphia, Pennsylvania
March 21, 2017

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BALANCE SHEETS
(in thousands)

	December 31, 2016	December 31, 2015
ASSETS		
Cash	\$ 3,580	\$ 3,507
Trade receivables, net:		
Receivables from third parties	31,836	32,682
Receivables from affiliates	46,891	34,932
Non-trade receivables from affiliates	7,250	1,329
Inventories	98,186	83,460
Other current assets	1,328	1,547
Total current assets	189,071	157,457
Property, plant and equipment, net	132,645	120,748
Other long-term assets	4,108	4,323
Total assets	<u>\$ 325,824</u>	<u>\$ 282,528</u>
LIABILITIES		
Line of credit	\$ —	\$ 15,000
Trade accounts payable	8,585	8,903
Accounts payable to affiliates	14,005	8,855
Other current liabilities	8,668	12,337
Total current liabilities	31,258	45,095
Other long-term liabilities	1,400	2,129
Total liabilities	32,658	47,224
Commitments and contingencies (note 12)		
PARTNERS' CAPITAL		
Contributed capital	54,930	54,930
Accumulated earnings	238,236	180,374
Net partners' capital	293,166	235,304
Total liabilities and partners' capital	<u>\$ 325,824</u>	<u>\$ 282,528</u>

See accompanying notes to financial statements.

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ZEOLYST INTERNATIONAL
STATEMENTS OF OPERATIONS AND ACCUMULATED EARNINGS
(in thousands)

	Year ended December 31,		
	2016	2015	2014
Net sales	\$ 168,875	\$ 170,649	\$ 147,318
Related party sales	93,655	148,986	66,150
Total net sales	262,530	319,635	213,468
Cost of goods sold	63,591	97,995	47,068
Related party cost of goods sold	78,316	89,389	72,375
Total cost of goods sold	141,907	187,384	119,443
Gross profit	120,623	132,251	94,025
Selling, general and administrative expenses	3,069	4,510	2,781
Related party SG&A	34,018	31,475	29,142
Operating income	83,536	96,266	62,102
Interest expense, net	169	281	360
Other expense, net	505	2,553	526
Net income	82,862	93,432	61,216
Accumulated earnings at beginning of year	180,374	146,942	151,726
Dividends paid	(25,000)	(60,000)	(66,000)
Accumulated earnings at end of year	<u>\$ 238,236</u>	<u>\$ 180,374</u>	<u>\$ 146,942</u>

See accompanying notes to financial statements.

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ZEOLYST INTERNATIONAL
STATEMENTS OF CHANGES IN PARTNERS' CAPITAL
(in thousands)

	Contributed capital	Accumulated earnings	Net partners' capital
PQ Corporation:			
Balance, December 31, 2013	\$ 27,465	\$ 75,863	\$ 103,328
Dividends paid		(33,000)	(33,000)
Net income		30,608	30,608
Balance, December 31, 2014	\$ 27,465	\$ 73,471	\$ 100,936
Dividends paid		(30,000)	(30,000)
Net income		46,716	46,716
Balance, December 31, 2015	\$ 27,465	\$ 90,187	\$ 117,652
Dividends paid		(12,500)	(12,500)
Net income		41,431	41,431
Balance, December 31, 2016	\$ 27,465	\$ 119,118	\$ 146,583
CRI Zeolites, Inc.:			
Balance, December 31, 2013	\$ 27,465	\$ 75,863	\$ 103,328
Dividends paid		(33,000)	(33,000)
Net income		30,608	30,608
Balance, December 31, 2014	\$ 27,465	\$ 73,471	\$ 100,936
Dividends paid		(30,000)	(30,000)
Net income		46,716	46,716
Balance, December 31, 2015	\$ 27,465	\$ 90,187	\$ 117,652
Dividends paid		(12,500)	(12,500)
Net income		41,431	41,431
Balance, December 31, 2016	\$ 27,465	\$ 119,118	\$ 146,583
Total partners' capital at December 31, 2013	\$ 54,930	\$ 151,726	\$ 206,656
Total partners' capital at December 31, 2014	\$ 54,930	\$ 146,942	\$ 201,872
Total partners' capital at December 31, 2015	\$ 54,930	\$ 180,374	\$ 235,304
Total partners' capital at December 31, 2016	\$ 54,930	\$ 238,236	\$ 293,166

See accompanying notes to financial statements.

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ZEOLYST INTERNATIONAL
STATEMENTS OF CASH FLOWS
(in thousands)

	Year ended December 31,		
	2016	2015	2014
Cash flows from operating activities:			
Net income	\$ 82,862	\$ 93,432	\$ 61,216
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and Amortization	13,066	10,294	9,626
Loss on Sale or Disposal of Capital Assets	26	—	21
Net change in returns allowance	(445)	17	(977)
Net change in inventory reserve	—	9	(341)
Working capital changes that provided (used) cash:			
Receivables, including affiliates	(16,589)	(26,372)	36,659
Inventories	(14,726)	16,384	(21,403)
Other current assets	219	(243)	49
Accounts payable, including affiliates	4,263	(4,095)	569
Other current liabilities	(3,669)	4,025	(12)
Other long-term liabilities	(952)	522	210
Other long-term assets	—	—	—
Net cash provided by operating activities	<u>\$ 64,055</u>	<u>\$ 93,973</u>	<u>\$ 85,617</u>
Cash flows from investing activities:			
Purchases of property, plant and equipment	(23,982)	(18,619)	(28,450)
Investment, at cost	—	(3,000)	—
Net cash used for investing activities	<u>(23,982)</u>	<u>(21,619)</u>	<u>(28,450)</u>
Cash flows from financing activities:			
Proceeds from line of credit	31,142	78,000	73,000
Payments on line of credit	(46,142)	(87,000)	(64,195)
Payments of cash dividends	(25,000)	(60,000)	(66,000)
Net cash used for financing activities	<u>(40,000)</u>	<u>(69,000)</u>	<u>(57,195)</u>
Net change in cash	73	3,354	(28)
Cash at beginning of period	3,507	153	181
Cash at end of period	<u>\$ 3,580</u>	<u>\$ 3,507</u>	<u>\$ 153</u>
Non-cash investing activity:			
Capital expenditures acquired on account but unpaid	3,173	2,604	1,717

See accompanying notes to financial statements.

ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)

1. Organization:

Zeolyst International, a General Partnership (“Partnership”) was formed in 1988 pursuant to a Joint Venture Agreement (“the Agreement”) between PQ Corporation (“PQ”) and CRI Zeolites (“CRI”), a Royal Dutch Shell affiliate (collectively, the “Partners”). The percentage interests as of December 31, 2016 and 2015 are as follows:

PQ	50%
CRI	50%

The Partnership was formed pursuant to the Kansas Uniform Partnership Act. The Agreement specifies that the partners share equally in capital contributions. The Agreement states that the profits and losses of the Partnership will be allocated in accordance with the partners’ interests in the Partnership. The intent of the Partnership is to develop, manufacture, and sell zeolites and zeolite-containing catalysts.

The Partnership has significant transactions with its partners and related affiliates. Refer to the Related Party Transactions footnote for further disclosure.

2. Partnership Business:

The Partnership manufactures zeolites and zeolytic catalysts that are used by refiners to capture impurities in the processing of petroleum and other chemicals. The filtration ability of zeolites placed into a customer’s chemical process generally extends two to three years. As a result, a significant portion of the Partnership’s customer base tends to change on an annual basis. A significant percentage of the base materials purchased for the Partnership’s manufacturing process is acquired from related parties. In addition, a significant portion of the Partnership’s sales is transacted through Criterion Catalyst Company (“Criterion”) which is a subsidiary of CRI. The Partnership compensates Criterion with a 2% sales commission on specific sales transactions.

3. Summary of Significant Accounting Policies:

These financial statements have been prepared in accordance with generally accepted accounting principles. These financial statements are accounted for on a historical cost basis and do not reflect the results of any purchase accounting adjustments recorded in the Partner’s consolidated financial statements.

Cash and Cash Equivalents. Cash and cash equivalents include investments with original terms to maturity of 90 days or less from the time of purchase.

Trade Accounts Receivables and Allowance for Doubtful Accounts: Trade accounts receivables are recorded at the invoiced amount and do not bear interest. The Partnership maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments. Allowances for doubtful accounts are based on historical experience and known factors regarding specific customers. If the financial condition of the Partnership’s customers were to deteriorate, resulting in an impairment of their ability to make payments, additional allowances would be required. Account balances are charged off against the allowance when it is probable the receivable will not be recovered.

Inventories: Inventories are stated at the lower of cost or market, valued on the first-in, first-out (“FIFO”) method. The Partnership establishes reserves for slow-moving and obsolete inventory.

Property, Plant and Equipment: Property, plant, and equipment are carried at cost and include expenditures for new facilities and major renewals and betterments. Interest is capitalized on capital projects as applicable.

ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)

Maintenance, repairs and minor renewals are charged to expense as incurred. When assets are sold or otherwise disposed of, the related cost and accumulated depreciation are removed from the accounts, and any resulting gain or loss is included in the results of operations.

Depreciation is generally provided on the straight-line method based on estimated useful lives of the assets, ranging up to 33 years for buildings and improvements, 10 years for machinery and equipment.

We perform an impairment review of Property Plant and Equipment and other long-lived assets when events and circumstances indicate that those assets may be impaired by comparing the carrying amount of the assets to their fair value. Fair value is determined using quoted market prices where available, or other techniques including discounted cash flows. The Partnership's estimates of future cash flows involve assumptions concerning future operating performance, economic conditions, and technological changes that may affect the future useful lives of the assets.

Other Long-term Assets: Other long-term assets primarily include investments, at cost and spare parts. On October 30, 2015, the Partnership made a \$3,000 strategic investment in a technology developer and licensor of materials-based solutions for catalytic and separations processes. The investment is accounted for under the cost method of accounting.

Revenue Recognition: The Partnership recognizes revenue when both title and risk of loss of the product have been transferred to the customer (generally upon shipment), the seller's price to the buyer is fixed or determinable, collectability is reasonably assured, and persuasive evidence of an arrangement exists. Customers take title and assume all the risks of ownership upon shipment (if terms are "FOB shipping point") or upon delivery (if terms are "FOB destination"). Any deviation from the standard terms and arrangements are reviewed for the proper accounting treatment, and revenue recognition is revised accordingly.

Prior to shipment, product specifications are verified with the customer through product samples. Specific performance reserves based on customer contracts are recorded in the other long-term liabilities account at the time of shipment. Estimates are calculated based on the performance of the catalyst over a specified run length.

We defer revenue recognition on certain of our product lines until all essential elements of the sales order have shipped and both title and risk of loss has passed to the customer. Hydrocracking and specialty catalyst orders are typically filled by a number of individual shipments, and those shipments may span the end of a fiscal quarter or year. If a portion of the order has not shipped and it is essential to the functionality of the customer's end use, all revenue associated with that order will be deferred until the order is completed. A shipment is considered essential if each individual shipment has no value to the customer on a stand-alone basis and if the remaining shipment is not considered inconsequential and perfunctory.

The Partnership reserves 2% of the Hydrocracking sales due to a clause in the contract that allows customers to return up to 5% of the unused products they purchase within 90 days, and based on historical experience. The total sales returns reserve as of December 31, 2016 and 2015 amounted to \$650 and \$1,095 respectively.

Shipping and Handling Costs: The Partnership classifies costs related to shipping and handling of products shipped to customers as cost of goods sold.

Research and Development: Research and development costs of \$16,033, \$13,994 and \$12,895 for the years ended December 31, 2016, 2015 and 2014, respectively, were expensed as incurred and reported in selling, general and administrative expenses in the accompanying statement of operations.

ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)

Foreign Exchange Transactions: The functional currency of the Partnership is the U.S. Dollar. The Partnership enters into transactions that are denominated in other currencies. Gains and losses on foreign currency transactions are included in other (income) / expense, net on the statement of operations. Foreign exchange loss of \$264 and \$2,353 and gains of \$326 were recognized for the years ended December 31, 2016, 2015 and 2014, respectively.

Fair Value Measurements: The Partnership's financial assets and liabilities are reflected in the financial statements at fair value. Fair value is defined as the price at which an asset could be exchanged in a current transaction between willing market participants. A liability's fair value is defined as the amount that would be paid to transfer the liability to a market participant, not the amount that would be paid to settle the liability with a creditor. The Partnership's cash balances approximate fair value due to their short-term maturity.

Use of Estimates: The preparation of the Partnership's financial statements in conformity with generally accepted accounting principles requires management to make estimates that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

4. Recently Issued Accounting Standards:

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. The new guidance is effective for nonpublic entities for fiscal years beginning after December 15, 2018 and interim periods within fiscal years beginning after December 15, 2019. Early adoption is permitted, and the new guidance should be applied retrospectively to each period presented. The Partnership 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. The guidance is effective for nonpublic entities for fiscal years beginning after December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. Early adoption is permitted. The new guidance must be adopted using a modified retrospective transition, and provides for certain practical expedients. The Partnership is currently evaluating the impact that the new guidance will have on its consolidated financial statements.

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 prices in the ordinary course of business, less reasonably predictable costs of completion, disposal and transportation, which is consistent with existing GAAP. The new guidance is effective for the Partnership as of January 1, 2017 for the year ending December 31, 2017, and for interim periods within the fiscal year beginning January 1, 2018. The Partnership does not expect this guidance to have a significant impact on its consolidated financial statements.

ZEOLYST INTERNATIONAL
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(in thousands)

In August 2014, the FASB issued guidance regarding management's responsibility to evaluate whether there is substantial doubt about an entity's ability to continue as a going concern within one year of the issuance of the financial statements. If substantial doubt exists, additional disclosures are required. This guidance was effective for the Partnership starting with the year ended December 31, 2016, and is effective for annual and interim periods thereafter. The adoption of the guidance did not have an impact on the Partnership's disclosures in the notes to its consolidated financial statements.

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 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. These new requirements for nonpublic entities become effective for annual reporting periods beginning after December 15, 2018, and interim periods within fiscal years beginning after December 15, 2019. A nonpublic entity may elect early application, but no earlier than the annual reporting period beginning after December 15, 2016, the early application date for public entities. The Partnership is assessing the impact of these new requirements on its consolidated financial statements.

5. Accounts Receivable and Allowance for Doubtful Accounts:

The components of accounts receivable are as follows:

	December 31, 2016	December 31, 2015
Trade accounts receivable	\$ 79,377	\$ 68,709
Allowance	(650)	(1,095)
	<u>\$ 78,727</u>	<u>\$ 67,614</u>

6. Inventories:

Inventories were classified and valued as follows:

	December 31, 2016	December 31, 2015
Finished products and work in process	\$ 91,608	\$ 78,565
Raw materials and containers	6,578	4,895
	<u>\$ 98,186</u>	<u>\$ 83,460</u>

ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)

7. Property, Plant and Equipment:

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

	December 31, 2016	December 31, 2015
Land and buildings	\$ 35,298	\$ 27,211
Machinery and equipment	161,185	132,386
Construction in progress	33,356	46,005
	229,839	205,602
Less: accumulated depreciation	(97,194)	(84,854)
	<u>\$ 132,645</u>	<u>\$ 120,748</u>

Depreciation expense was \$12,628, \$9,406 and \$9,113 for the years ended December 31, 2016, 2015, and 2014, respectively. Disposal of assets reduced PP&E and Accumulated Depreciation by \$314, \$749, and \$85, respectively with a \$26, \$0, and \$21 reduction to earnings for the years ended December 31, 2016, 2015, and 2014, respectively.

8. Other Current Liabilities:

A summary of other current liabilities is as follows:

	December 31, 2016	December 31, 2015
Accrued royalties and license fees	\$ 5,305	\$ 2,283
Accrued commissions	863	4,024
Accrued rebates	950	4,036
Accrued other	1,550	1,994
	<u>8,668</u>	<u>12,337</u>

9. Revolver:

On March 30, 2011, the Partnership entered into a five-year revolving line of credit facility of \$60,000, which carries an initial interest rate of LIBOR + 25 basis points. The agreement expires on March 30, 2016. The interest rate on the facility is LIBOR as adjusted per the agreement plus an interest margin ranging from .25% to .75% per annum based on the Partnership's debt to EBITDA ratio. A commitment fee is paid to the bank for this agreement. For the years ended December 31, 2015 availability under this agreement was \$45,000.

The revolving credit agreement contains certain restrictions and covenants that require the Partnership to maintain a minimum partners' equity, as defined, of \$60,000 plus 10% of net income, an interest coverage ratio, as defined, at or above 3.00, and a total leverage ratio, as defined, at a maximum of 3.00, on a quarterly basis. The Partnership was in compliance with all covenants during 2015.

On March 2, 2016, the Partnership entered into a five-year revolving line of credit facility of \$60,000, which carries an initial interest rate of LIBOR. The agreement expires on March 1, 2021. The interest rate on the facility is LIBOR plus an interest margin ranging from .75% to 1.00% per annum based on the Partnership's debt to EBITDA ratio. A commitment fee is paid to the bank for this agreement. For the year ended December 31, 2016 availability under this agreement was \$60,000.

**ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)**

The revolving credit agreement contains certain restrictions and covenants that require the Partnership to maintain a minimum partners' equity, as defined, of \$100,000 plus 10% of net income, and a minimum EBITDA of \$40,000 on a last twelve month basis measured quarterly. The Partnership was in compliance with all covenants during 2016.

Cash payments for interest were approximately \$180, \$275 and \$338 for the years ended December 31, 2016, 2015 and 2014, respectively.

The fair value of a financial instrument is the amount at which the instrument could be exchanged in a current transaction. The carrying amount of the revolving line of credit approximates fair value because it is a short-term liquidity tool to fund operations, which is drawn down and paid back with cash generated from operations.

10. Partners' Contributions:

In accordance with the Agreement, in the event that cash flow from operations is insufficient to meet the Partnership's requirements, following a majority vote by the Management Committee of the Partnership to request capital from the partners, the partners will provide additional capital to enable the Partnership to meet its obligations. No such contributions were made during the years ended December 31, 2016, 2015, or 2014 as the Partnership had the ability to finance operations through cash flow from operations and borrowings under the Partnership's revolving line of credit facility.

11. Income Taxes:

As a partnership, Zeolyst International is not liable for the payment of taxes on income in the U.S. Net income and losses are allocated to the respective partners on an annual basis, and it is the partners' responsibility to pay income taxes, if any, thereon according to their respective tax positions.

12. Commitments and Contingent Liabilities:

In 1998, the Partnership entered into a ten year tolling agreement ("the Tolling Agreement") with CRI Belgium, a related party, for the manufacture of specialty extruded products. Effective January 2004, the 1998 Tolling Agreement was replaced by a new evergreen ten-year tolling agreement with CRI Belgium. Both parties can terminate this agreement without cause with twenty-four months' notice. The Partnership pays CRI Belgium a daily charge rate based on the actual days of production. This charge is included in cost of goods sold and totaled \$18,330, \$29,877 and \$19,103 for the years ended December 31, 2016, 2015 and 2014, respectively. In addition, for certain capital expenditures, that are beneficial to the Partnership, the parties will mutually agree on future adjustments to the daily charge rates or propose an alternative method of the Partnership's contribution to those costs.

During 2007, the Partnership entered into a License Agreement with a third party to obtain exclusive licensing rights to use the technology in the manufacturing, using and selling of Powder catalyst and Shaped catalyst. The consideration for the licensing rights includes (1) a down payment of \$3,200 payable in six annual installments to acquire the product license, and (2) royalty payments at a rate of 10% of the Powder and Shaped Net Sale price during the royalty period. The \$3,200 is payable as follows: \$500 was paid at the date of the agreement, \$500 at first, second, and third anniversaries of the agreement, and \$600 at the fourth and fifth anniversary of the agreement. The product license intangible is being amortized over the life of the agreement on a straight-line basis, which is estimated to be 15 years. Amortization expense of \$213 was recognized in 2016,

ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)

2015 and 2014. The royalty period of 10 years began in 2013, immediately after the date on which the Partnership had cumulatively produced the first 250 metric tons of Powder and Shaped catalyst. If at the end of the Royalty Period, the cumulative of running royalties actually paid by the Partnership is less than \$3,000, the Partnership will be obligated to pay the difference between the \$3,000 and the actual cumulative running royalty amount. As of December 31, 2016 and 2015 there were \$1,982 and \$1,681 respectively, liabilities recorded related to this agreement.

During 2013 the Partnership entered into a Sublicense Agreement with a third party to obtain patent and know-how licensing rights to make, use, import, and sell the Licensed Process and Products in the Licensed field. The consideration for the licensing rights includes a payment of \$1,500 payable in three installments. The \$1,500 is payable as follows: \$500 will be paid at the date of the first successful sale of commercialized product, or 36 months from execution of the license agreement, \$500 after sale of 0.5 million pounds of product, or 48 months from execution of the license agreement, and \$500 after sale of 1.0 million pounds of product, or 60 months from execution of the license agreement. In October 2016, the agreement was amended to extend payment terms. The payment of \$1,500 is payable as follows: \$500 will be paid at the date of the first successful sale of commercialized product, or 69 months from execution of the license agreement, \$500 after sale of 0.5 million pounds of product, or 81 months from execution of the license agreement, and \$500 after sale of 1.0 million pounds of product, or 93 months from execution of the license agreement. The product license intangible will be amortized prospectively with this change in estimated life. Amortization expense of \$225, and \$675 was recognized in the years ending December 31, 2016, and 2015 respectively.

13. Related Party Transactions:

Policies and Procedures

The Partnership maintains certain policies and procedures for the review, approval, and ratification of related party transactions to ensure that all transactions with selected parties are fair and reasonable. All significant relationships and transactions are separately identified by management if they meet the definition of a related party or a related party transaction. Related party transactions include transactions that occurred during the year, in which the Partnership was or will be a participant and which any related person had or will have a direct or indirect material interest. Due to the nature of the Partnership, material related party transactions are identified on a transaction-based approach. The types of transactions identified and reviewed include, but are not limited to, sales of products, purchases of inventory, tolling costs, sales and marketing costs, research and development, and management-related fees. All related party transactions are reviewed, approved and documented by the appropriate level of the Partnership's management in accordance with these policies and procedures.

PQ

Under the terms of the Agreement, the Partnership leases certain land used in its Kansas City production facilities from PQ. This lease, which has been recorded as an operating lease, provided for rental payments of \$280, \$265, and \$250 for the years ended December 31, 2016, 2015 and 2014, respectively. The rent expense is included in the cost of goods sold line item in the accompanying statement of operations. The terms of this lease are evergreen as long as the Partnership agreement is in place. The Partnership recognized sales to PQ of \$1,191, \$0, and \$0 in the years ended December 31, 2016, 2015, and 2014 respectively. The Partnership purchases certain of its raw materials from PQ and is charged for various manufacturing costs incurred at the PQ Kansas City production facility. The amount of these costs charged to the Partnership during the years ended December 31, 2016, 2015 and 2014 were \$15,514, \$14,021 and \$14,284, respectively. These costs are a component of production costs and are included in the cost of goods sold line item in the accompanying

ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)

statement of operations when the inventory is sold. Certain administrative, marketing, engineering, management-related, and research and development services are provided to the Partnership by PQ. During the years ended December 31, 2016, 2015 and 2014, the Partnership was charged \$12,325, \$12,551 and \$10,164, respectively, for these services. These amounts are included in the selling, general and administrative line item in the accompanying statement of operations. In addition, certain product demonstration costs of \$2,169, \$1,598 and \$1,832 during the years ended December 31, 2016, 2015 and 2014, respectively, were recorded in the COGS line of the accompanying statement of operations.

At December 31, 2016 and 2015, the accounts payable to affiliates consisted of \$2,472 and \$2,462 due to PQ. Included in trade accounts receivable at December 31, 2016 and 2015 was \$840 and \$0, respectively due from PQ.

On December 18, 2013, PQ and ZI, entered into a real estate tax abatement agreement with the Unified Government of Wyandotte County and Kansas City, Kansas that will utilize an Industrial Revenue Bond financing structure to achieve a 75% real estate tax abatement on the value of the improvements that will be constructed during the expansion of PQ's and ZI's facilities at the jointly-operated Kansas City, Kansas plant. In accordance with ASC 210-20-45, the financing obligation and the industrial bond receivable have been presented on a net basis.

CRI and Royal Dutch Shell Affiliates

Royal Dutch Shell affiliates include CRI Zeolites, Criterion, Shell Development Company, Shell Research and Technology Center—Amsterdam, CRI Center Marketing Asia Pacific, Shell International Oil Products, CRI Belgium and CRI Technology Services. As described in footnote 2, a significant portion of the Partnership's sales are transacted through Criterion. During the years ended December 31, 2016, 2015 and 2014 the Partnership recognized sales transacted through Criterion of \$92,463, \$148,986 and \$66,150, respectively. The Partnership purchases certain of its raw materials and is charged for tolling, customer distribution and packaging costs incurred by Criterion. The amount of these costs charged to the Partnership during the years ended December 31, 2016, 2015 and 2014 were \$22,364, \$44,793 and \$25,482, respectively. These costs are a component of production costs and are included in the cost of goods sold line item in the accompanying statement of operations when the inventory is sold. Certain engineering, management-related, broker-related, and research and development services are provided to the Partnership by CRI and Royal Dutch Shell affiliates. During the years ended December 31, 2016, 2015 and 2014, the Partnership was charged \$21,694, \$18,923 and \$18,978, respectively, for these services. These amounts are included in the selling, general and administrative line item in the accompanying statement of operations.

At December 31, 2016 and 2015, the accounts payable to affiliates balance consisted of \$11,533 and \$6,593, respectively, due to CRI and Shell affiliates. Included in trade accounts receivable at December 31, 2016 and 2015 was \$46,051 and \$34,932, respectively, of receivables related to sales transacted through Criterion, as described above.

Zeolyst C.V.

Zeolyst C.V. is a limited partnership formed in 1993 pursuant to a joint venture agreement between PQ Zeolites B.V. and CRI Zeolites for the purpose of the production of Zeolite powders. The Partnership entered into an agreement with Zeolyst C.V. to purchase Zeolite powders manufactured by Zeolyst C.V. Under the terms of the agreement, products manufactured by Zeolyst C.V. are supplied solely to the Partnership. The Partnership has performed a qualitative and quantitative analysis and concluded that for Zeolyst C.V. for which it holds a

ZEOLYST INTERNATIONAL
NOTES TO FINANCIAL STATEMENTS
(in thousands)

variable interest but will not absorb a majority of the expected losses or residual returns, the Partnership is not the primary beneficiary and therefore, this VIE was not consolidated in the Partnership's Consolidated Financial Statements. The Partnership has no unfunded commitments or guarantees as a result of its involvement with Zeolyst C.V. The total carrying value of assets and liabilities for Zeolyst C.V was \$89,924 and \$12,323, as of December 31, 2016 and was \$85,705 and \$6,828 as of December 31, 2015, respectively. The Partnership currently does not have any exposure to any losses by Zeolyst C.V. The Partnership has purchased \$37,989, \$28,711 and \$30,527 through the sales agreement during the years ended December 31, 2016, 2015 and 2014, respectively. These costs are a component of production costs and are included in the cost of goods sold line item in the accompanying statement of operations when the inventory is sold.

At December 31, 2016 and 2015, the accounts receivable from affiliates balance consisted of \$7,250 and \$1,329, respectively, due from Zeolyst C.V.

14. Subsequent Events:

The Partnership has evaluated subsequent events from the balance sheet date through March 21, 2017 and determined there are no further items to disclose.

Shares

PQ GROUP HOLDINGS INC.

Common Stock



*Morgan Stanley
J.P. Morgan*

*Jefferies
Evercore ISI*

*Goldman Sachs & Co. LLC
Deutsche Bank Securities*

*Citigroup
Nomura*

*Credit Suisse
KeyBanc Capital Markets*

Through and including _____, 2017 (the 25th day after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to a dealer's obligation to deliver a prospectus when acting as an underwriter and with respect to an unsold allotment or subscription.

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PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 13. Other Expenses of Issuance and Distribution.

The following table sets forth the estimated expenses payable by us in connection with the sale and distribution of the securities registered hereby, other than underwriting discounts or commissions. All amounts are estimates except for the SEC registration fee and the Financial Industry Regulatory Authority filing fee.

SEC Registration fee	\$11,590
FINRA filing fee	\$15,500
Stock exchange listing fee	*
Printing and engraving expenses	*
Legal fees and expenses	*
Accounting fees and expenses	*
Transfer agent and registrar fees	*
Miscellaneous fees and expenses	*
Total	*

* To be completed by amendment.

Item 14. Indemnification of Directors and Officers.

Section 145 of the General Corporation Law of the State of Delaware provides as follows:

A corporation shall have the power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation) by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with such action, suit or proceeding if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe the person's conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction or upon a plea of nolo contendere or its equivalent, shall not, of itself, create a presumption that the person did not act in good faith and in a manner which the person reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had reasonable cause to believe that the person's conduct was unlawful.

A corporation shall have the power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against expenses (including attorneys' fees) actually and reasonably incurred by the person in connection with the defense or settlement of such action or suit if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation and except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

As permitted by the Delaware General Corporation Law, we have included in our certificate of incorporation a provision to eliminate the personal liability of our directors for monetary damages for breach of

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their fiduciary duties as directors, subject to certain exceptions. In addition, our certificate of incorporation and bylaws provide that we are required to indemnify our officers and directors under certain circumstances, including those circumstances in which indemnification would otherwise be discretionary, and we are required to advance expenses to our officers and directors as incurred in connection with proceedings against them for which they may be indemnified.

We intend to enter into indemnification agreements with our directors and officers. These agreements will provide broader indemnity rights than those provided under the Delaware General Corporation Law and our certificate of incorporation. The indemnification agreements are not intended to deny or otherwise limit third-party or derivative suits against us or our directors or officers, but to the extent a director or officer were entitled to indemnity or contribution under the indemnification agreement, the financial burden of a third-party suit would be borne by us, and we would not benefit from derivative recoveries against the director or officer. Such recoveries would accrue to our benefit but would be offset by our obligations to the director or officer under the indemnification agreement.

The underwriting agreement provides that the underwriters are obligated, under certain circumstances, to indemnify our directors, officers and controlling persons against certain liabilities, including liabilities under the Securities Act. Reference is made to the form of underwriting agreement filed as Exhibit 1.1 hereto.

We maintain directors' and officers' liability insurance for the benefit of our directors and officers.

Item 15. Recent Sales of Unregistered Securities

Equity Securities

In connection with the Business Combination, on May 4, 2016 we issued (i) an aggregate of 430,107 shares of our Class A common stock in exchange for equity securities of PQ Holdings, (ii) an aggregate of 5,128,585 shares of our Class B common stock in exchange for equity securities of PQ Holdings, (iii) an aggregate of 1,513,683 shares of our Class B common stock in exchange for equity units of Eco Services Group Holdings LLC, (iv) an aggregate of 197,144 shares of our restricted Class A common stock subject to vesting conditions in exchange for restricted equity securities of PQ Holdings, (v) an aggregate of 46,936 shares of our restricted Class B common stock subject to vesting conditions in exchange for restricted equity securities of PQ Holdings, (vi) options to purchase an aggregate of 40,806 shares of our Class A common stock at a weighted average exercise price of \$70.94 per share in exchange for outstanding options to purchase equity securities of PQ Holdings, and (vii) options to purchase an aggregate of 156,139 shares of our Class A common stock at a weighted average exercise price of \$70.94 per share in exchange for Class A units of Eco Services Group Holdings LLC.

From May 4, 2016 through December 31, 2016, we issued (i) an aggregate of 34,431 shares of our Class B common stock for aggregate consideration of \$5,012,849, (ii) options to purchase an aggregate of 61,049 shares of our Class A common stock at a weighted average exercise price of \$71.01 per share under the PQ Group Holdings Inc. Stock Incentive Plan, (iii) an aggregate of 15,862 shares of our restricted Class B common stock subject to vesting conditions under the PQ Group Holdings Inc. Stock Incentive Plan and (iv) an aggregate of 1,935 shares of our Class B common stock under the PQ Group Holdings Inc. Stock Incentive Plan.

From January 1, 2017 through August 31, 2017, we issued (i) an aggregate of 2,056 shares of our restricted Class B common stock subject to vesting conditions under the PQ Group Holdings Inc. Stock Incentive Plan and (ii) options to purchase an aggregate of 49,435 shares of our Class A common stock at a weighted average exercise price of \$79.25 per share under the PQ Group Holdings Inc. Stock Incentive Plan.

The issuances of the securities in the transactions described above were issued without registration in reliance on the exemptions afforded by Section 4(a)(2) of the Securities Act and Rules 506 and 701 promulgated thereunder.

The foregoing share numbers do not reflect the Reclassification.

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Debt Securities

In connection with the Business Combination, on May 4, 2016, PQ Corporation issued \$625.0 million aggregate principal amount of 6.75% Senior Secured Notes at a price of 99% of their face value resulting in approximately \$618.8 million of aggregate gross proceeds. The initial purchasers for the 6.75% Senior Secured Notes were Citigroup Global Markets Inc., Credit Suisse Securities (USA) LLC, Morgan Stanley & Co. LLC, J.P. Morgan Securities LLC, Jefferies LLC, Goldman Sachs & Co. LLC, Deutsche Bank Securities Inc. and KeyBanc Capital Markets Inc. The aggregate amount of the initial purchasers' discount on the 6.75% Senior Secured Notes was approximately \$6.3 million. The 6.75% Senior Secured Notes were offered and sold to the initial purchasers in reliance on the exemption afforded by Section 4(a)(2) of the Securities Act and Rule 506 promulgated thereunder and were offered and resold by the initial purchasers to qualified institutional buyers pursuant to Rule 144A under the Securities Act and to non-U.S. investors outside the United States in compliance with Regulation S of the Securities Act.

Also in connection with the Business Combination, on May 4, 2016, PQ Corporation issued \$525.0 million aggregate principal amount of Floating Rate Senior Unsecured Notes at a price of 98% of their face value resulting in approximately \$514.5 million of aggregate gross proceeds. The Floating Rate Senior Unsecured Notes were issued in a private placement to accredited investors in reliance on the exemption afforded by Section 4(a)(2) of the Securities Act and Rule 506 promulgated thereunder.

The proceeds from the sale of the 6.75% Senior Secured Notes and the Floating Rate Senior Unsecured Notes were used, together with borrowings under PQ Corporation's senior secured credit facilities and cash on hand, to repay outstanding indebtedness and redeem outstanding notes.

Item 16. Exhibits and Financial Statement Schedules

(a) Exhibits

<u>Exhibit No.</u>	<u>Description</u>
1.1	Form of Underwriting Agreement
3.1	Form of Second Restated Certificate of Incorporation of PQ Group Holdings Inc.
3.2	Form of Amended and Restated Bylaws of PQ Group Holdings Inc.
4.1*	Indenture, dated May 4, 2016, among PQ Corporation, the Guarantors from time to time party thereto and Wells Fargo Bank, National Association, as Trustee and Collateral Agent, including the form of Global Note attached as Exhibit A thereto
4.2*	Note Purchase Agreement, dated May 4, 2016, by and among PQ Corporation, Wilmington Trust, National Association, as Noteholder Agent and each of the Purchasers listed on Schedule A thereto, including the form of Senior Note attached as Exhibit 1.1 thereto
4.3*	Indenture, dated as of October 24, 2014, among Eco Services Operations LLC, Eco Finance Corp. and Wilmington Trust, National Association, as Trustee, including the form of Global Note attached as Exhibit A thereto
4.4*	First Supplemental Indenture, dated as of May 4, 2016, among PQ Corporation, the Guarantors named on the signature pages thereto and Wilmington Trust, National Association, as Trustee
5.1+	Opinion of Ropes & Gray LLP
10.1*	Term Loan Credit Agreement, dated as of May 4, 2016, by and among PQ Corporation, CPQ Midco I Corporation, the Lenders from time to time party thereto, and Credit Suisse AG, Cayman Islands Branch, as Administrative Agent and Collateral Agent, with Citigroup Global Markets Inc., Credit Suisse Securities (USA) LLC, JPMorgan Chase Bank, N.A., Morgan Stanley Senior Funding, Inc., Deutsche Bank Securities Inc., Goldman Sachs Lending Partners LLC, Jefferies Finance LLC and KeyBanc Capital Markets Inc., as Joint Lead Arrangers and Joint Bookrunners

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10.2*	First Amendment Agreement, dated as of November 14, 2016, to the Term Loan Credit Agreement dated as of May 4, 2016, among PQ Corporation, CPQ Midco I Corporation, the Guarantors named on the signature pages thereto, JPMorgan Chase Bank, N.A., as an Additional Term Lender, and Credit Suisse AG, Cayman Islands Branch, as Administrative Agent and Collateral Agent
10.3*	ABL Credit Agreement, dated as of May 4, 2016, by and among PQ Corporation, CPQ Midco I Corporation, the Canadian Borrowers from time to time party thereto, the European Borrowers from time to time party thereto, the Lenders from time to time party thereto and Citibank, N.A., as Administrative Agent and Collateral Agent, with Citigroup Global Markets Inc., Credit Suisse Securities (USA) LLC, JPMorgan Chase Bank, N.A., Morgan Stanley Senior Funding, Inc., Deutsche Bank Securities Inc., Goldman Sachs Lending Partners LLC, Jefferies Finance LLC and KeyBanc Capital Markets Inc., as Joint Lead Arrangers and Joint Bookrunners
10.4*	Lease Agreement, dated January 1, 2017, by and between The Realty Associates Fund X, L.P. and PQ Corporation
10.5	Form of Amended and Restated Stockholders Agreement between PQ Group Holdings Inc. and certain stockholders of PQ Group Holdings Inc.
10.6*	PQ Group Holdings Inc. Stock Incentive Plan
10.7*	Form of Nonqualified Stock Option Award Agreement under the PQ Group Holdings Inc. Stock Incentive Plan
10.8*	Form of Restricted Stock Agreement under the PQ Group Holdings Inc. Stock Incentive Plan
10.9	Form of Director and Officer Indemnification Agreement
10.10*	Partnership Agreement, dated as of February 1, 1988, by and between PQ Corporation and Shell Polymers and Catalysts Enterprises Inc.
10.11*	First Amendment to Partnership Agreement, dated January 1, 1993, by and among PQ Corporation, Shell Catalyst Ventures Inc. and CRI Zeolites Inc.
10.12*	Second Amendment to Partnership Agreement, dated October 18, 2002, by and between PQ Corporation and Shell Catalyst Ventures Inc.
10.13*	Third Amendment to Partnership Agreement, dated January 1, 2005, by and between PQ Corporation and CRI Zeolites Inc.
10.14	PQ Group Holdings Inc. 2017 Omnibus Incentive Plan
10.15	Form of Stock Option Award Agreement under the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan
10.16	Form of Restricted Stock Award Agreement under the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan
10.17	Form of Restricted Stock Unit Award Agreement under the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan
10.18+	Severance Agreement with James Gentilcore
10.19+	Severance Agreement with Michael Crews
10.20+	Severance Agreement with Scott Randolph
10.21+	Severance Agreement with Paul Ferrall
10.22*	Second Amendment Agreement, dated August 7, 2017, to the Term Loan Credit Agreement dated as of May 4, 2016 (as amended by the First Amendment Agreement dated as of November 14, 2016), among PQ Corporation, CPQ Medco I Corporation, the Guarantors named on the signature pages thereto, Citibank, N.A., as an Additional Term Lender, and Credit Suisse AG, Cayman Islands Branch, as Administrative Agent and Collateral Agent

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16.1*	Letter from Deloitte & Touche LLP dated August 14, 2017
21.1*	Subsidiaries of PQ Group Holdings Inc.
23.1	Consent of PricewaterhouseCoopers LLP related to the financial statements of PQ Group Holdings Inc. as of December 31, 2016 and 2015 and for the years then ended.
23.2	Consent of Deloitte & Touche LLP related to the financial statements of Eco Services Operations LLC (accounting predecessor to PQ Group Holdings Inc.) for the period from inception (July 30, 2014) to December 31, 2014 (Successor Period), and of Eco, a business unit of Solvay USA Inc., for the period from January 1, 2014 through November 30, 2014 (Predecessor Period)
23.3	Consent of PricewaterhouseCoopers LLP related to the financial statements of PQ Holdings Inc. as of December 31, 2015 and 2014 and for each of the three years in the period ended December 31, 2015
23.4	Consent of PricewaterhouseCoopers LLP related to the financial statements of Zeolyst International as of December 31, 2016 and 2015 and for each of the three years in the period ended December 31, 2016
23.5+	Consent of Ropes & Gray LLP (included in Exhibit 5.1)
24.1*	Powers of Attorney
24.2*	Powers of Attorney for Martin S. Craighead and Kimberly Ross

+ To be filed by amendment.

* Previously filed.

(b) Financial Statement Schedules

All schedules are omitted because they are not applicable or the required information is included in the financial statements or notes thereto.

Item 17. Undertakings

The undersigned registrant hereby undertakes to provide to the underwriters at the closing specified in the underwriting agreement certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The undersigned Registrant hereby undertakes: (1) That for purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b) (1) or (4) or 497(h) under the Securities Act of 1933 shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) That for the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

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SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Malvern, Commonwealth of Pennsylvania, on the 1st day of September, 2017.

PQ GROUP HOLDINGS INC.

By: /s/ James F. Gentilcore
Name: James F. Gentilcore
Title: Chief Executive Officer, President and Director

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ James F. Gentilcore</u> James F. Gentilcore	Chief Executive Officer, President and Director (Principal Executive Officer)	September 1, 2017
<u>*</u> Michael Crews	Executive Vice President and Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	September 1, 2017
<u>*</u> Michael Boyce	Chairman of the Board of Directors	September 1, 2017
<u>*</u> Greg Brenneman	Director	September 1, 2017
<u>*</u> Timothy Walsh	Director	September 1, 2017
<u>*</u> Chris Behrens	Director	September 1, 2017
<u>*</u> Mark McFadden	Director	September 1, 2017
<u>*</u> Robert Toth	Director	September 1, 2017
<u>*</u> Robert Coxon	Director	September 1, 2017
<u>*</u> Andrew Currie	Director	September 1, 2017

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<u>Signature</u>	<u>Title</u>	<u>Date</u>
* _____ Jonny Ginns	Director	September 1, 2017
* _____ Kyle Vann	Director	September 1, 2017
* _____ Martin S. Craighead	Director	September 1, 2017
* _____ Kimberly Ross	Director	September 1, 2017

*By: /s/ James F. Gentilcore
James F. Gentilcore
Attorney-in-fact

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EXHIBIT INDEX

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24.1*	<u>Powers of Attorney</u>
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+ To be filed by amendment.

* Previously filed.

[] Shares

**PQ GROUP HOLDINGS INC.
COMMON STOCK, PAR VALUE \$0.01 PER SHARE
UNDERWRITING AGREEMENT**

[], 2017

Morgan Stanley & Co. LLC
Goldman Sachs & Co. LLC
As representatives of the several Underwriters (the "Representatives")

c/o Morgan Stanley & Co. LLC
1585 Broadway
New York, New York 10036

c/o Goldman Sachs & Co. LLC
200 West Street
New York, New York 10282

Ladies and Gentlemen:

PQ Group Holdings Inc., a Delaware corporation (the "**Company**"), proposes to issue and sell to the several Underwriters named in Schedule I hereto (the "**Underwriters**") [] shares of its Common Stock, par value \$0.01 per share (the "**Firm Shares**"). The Company also proposes to issue and sell to the several Underwriters not more than an additional [] shares of its Common Stock, par value \$0.01 per share (the "**Additional Shares**"), if and to the extent that you, as the Representatives of the offering, shall have determined to exercise, on behalf of the Underwriters, the right to purchase such shares of common stock granted to the Underwriters in Section 2 hereof. The Firm Shares and the Additional Shares are hereinafter collectively referred to as the "**Shares**." The shares of Common Stock, par value \$0.01 per share, of the Company to be outstanding after giving effect to the sales contemplated hereby are hereinafter referred to as the "**Common Stock**."

The Company has filed with the Securities and Exchange Commission (the "**Commission**") a registration statement, including a prospectus, relating to the Shares. The registration statement as amended at the time it becomes effective, including the information (if any) deemed to be part of the registration statement at the time of effectiveness pursuant to Rule 430A under the Securities Act of 1933, as amended (the "**Securities Act**"), is hereinafter referred to as the "**Registration Statement**"; the prospectus in the form first used to confirm sales of Shares (or in the form first made available to the Underwriters by the Company to meet requests of purchasers pursuant to Rule 173 under the Securities Act) is hereinafter referred to as the "**Prospectus**." If the Company has filed an abbreviated registration statement to register additional shares of Common Stock pursuant to Rule 462(b) under the Securities Act (the "**Rule 462 Registration Statement**"), then any reference herein to the term "**Registration Statement**" shall be deemed to include such Rule 462 Registration Statement.

For purposes of this Agreement, “**free writing prospectus**” has the meaning set forth in Rule 405 under the Securities Act, “**Time of Sale Prospectus**” means the preliminary prospectus together with the documents and pricing information set forth in Schedule II hereto, and “**broadly available road show**” means a “bona fide electronic road show” as defined in Rule 433(h)(5) under the Securities Act that has been made available without restriction to any person. As used herein, the terms “Registration Statement,” “preliminary prospectus,” “Time of Sale Prospectus” and “Prospectus” shall include the documents, if any, incorporated by reference therein as of the date hereof.

1. *Representations and Warranties.* The Company represents and warrants to and agrees with each of the Underwriters that:

(a) The Registration Statement has become effective; no stop order suspending the effectiveness of the Registration Statement is in effect, and no proceedings for such purpose or pursuant to Section 8A of the Securities Act are pending before or, to the Company’s knowledge, threatened by the Commission.

(b) (i) The Registration Statement, when it became effective, did not contain and, as amended or supplemented, if applicable, as of the date of such amendment or supplement, will not contain, any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading, (ii) the Registration Statement and the Prospectus comply and, as amended or supplemented, if applicable, as of the date of such amendment or supplement, will comply, in all material respects with the Securities Act and the applicable rules and regulations of the Commission thereunder, (iii) the Time of Sale Prospectus does not, and at the time of each sale of the Shares in connection with the offering when the Prospectus is not yet available to prospective purchasers and at the Closing Date (as defined in Section 4), the Time of Sale Prospectus, as then amended or supplemented by the Company, if applicable, will not, contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, (iv) each broadly available road show, if any, when considered together with the Time of Sale Prospectus, does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading and (v) the Prospectus does not contain and, as amended or supplemented, if applicable, as of its date or as of the Closing Date, will not contain, any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, except that the representations and warranties set forth in this paragraph do not apply to statements or omissions in the Registration Statement, the Time of Sale Prospectus or the Prospectus based upon information relating to any Underwriter furnished to the Company in writing by such Underwriter through or on behalf of you expressly for use therein.

(c) The Company is not an “ineligible issuer” in connection with the offering pursuant to Rules 164, 405 and 433 under the Securities Act. Any free writing prospectus that the Company is required to file pursuant to Rule 433(d) under the Securities Act has been, or will be, filed with the Commission in accordance with the requirements of the Securities Act and the applicable rules and regulations of the Commission thereunder. Each free writing prospectus that the Company has filed, or is required to file, pursuant to Rule 433(d) under the Securities Act or that was prepared by or on behalf of or used or referred to by the Company complies or, if filed after the date of this Agreement, will comply as of the date of such filing, in all material respects with the requirements of the Securities Act and the applicable rules and regulations of the Commission thereunder. Except for the free writing prospectuses, if any, identified in Schedule II hereto, and electronic road shows, if any, each furnished to you before first use, the Company has not prepared, used or referred to, and will not, without your prior consent, prepare, use or refer to, any free writing prospectus.

(d) Each of the Company and its significant subsidiaries (as such term is defined in Rule 1-02 of Regulation S-X under the Exchange Act (as defined below)) has been duly incorporated or formed, as applicable, and is validly existing as a corporation, limited liability company or limited partnership, as applicable, in good standing under the laws of the jurisdiction of its incorporation or formation, as applicable, and has the requisite power and authority to own, lease and operate each of their respective properties and to conduct each of their respective businesses as described in the Time of Sale Prospectus. Each of the Company and such significant subsidiaries is duly qualified as a foreign corporation, limited liability company or limited partnership, as applicable, to transact business and is in good standing or equivalent status (to the extent such concept is applicable in such jurisdiction) in each jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property or the conduct of business, except for such jurisdictions where the failure to so qualify or to be in good standing would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Change (as defined below). The subsidiaries listed on Schedule III are the only significant subsidiaries of the Company.

(e) All of the issued shares of capital stock of each subsidiary of the Company have been duly and validly authorized and issued, are fully paid and non-assessable (to the extent such concepts are applicable in such jurisdiction) and are owned directly by the Company or a subsidiary of the Company, free and clear of all liens, encumbrances, equities or claims, except as described in each of the Registration Statement, the Time of Sale Prospectus and the Prospectus, respectively.

(f) This Agreement has been duly authorized, executed and delivered by the Company.

(g) The authorized capital stock of the Company conforms as to legal matters to the description thereof contained in each of the Time of Sale Prospectus and the Prospectus.

(h) The shares of Common Stock outstanding prior to the issuance of the Shares have been duly authorized and are validly issued, fully paid and non-assessable.

(i) The Shares have been duly authorized and, when issued, delivered and paid for in accordance with the terms of this Agreement, will be validly issued, fully paid and non-assessable, and the issuance of such Shares will not be subject to any preemptive or similar rights.

(j) The execution and delivery by the Company of, and the performance by the Company of its obligations under, this Agreement will not contravene any provision of (i) applicable law, (ii) the certificate of incorporation or by-laws of the Company, (iii) any agreement or other instrument binding upon the Company or any of its subsidiaries that is material to the Company and its subsidiaries, taken as a whole, or (iv) any judgment, order or decree of any governmental body, agency or court having jurisdiction over the Company or any subsidiary, except in the case of clauses (i), (iii) and (iv), for such contraventions as would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Change or adversely affect the ability of the Company to perform its obligations under this Agreement, and no consent, approval, authorization or order of, or qualification with, any governmental body or agency is required for the performance by the Company of its obligations under this Agreement, except such as have been previously obtained or may be required by the securities or Blue Sky laws of the various states or foreign jurisdictions or the rules and regulations of the Financial Industry Regulatory Authority in connection with the offer and sale of the Shares.

(k) Deloitte & Touche LLP (“**Deloitte**”) and PricewaterhouseCoopers LLP (“**PwC**”), each of which certified certain financial statements (which term as used in this Agreement includes the related notes thereto), in the case of Deloitte, (i) with respect to Eco, a business unit of Solvay USA Inc., for the period from January 1, 2014 through November 30, 2014 and (ii) with respect to Eco Services Operations LLC (accounting predecessor to the Company) for the period from inception (July 30, 2014) to December 31, 2014, and in the case of PwC, (i) with respect to the Company for the years ended December 31, 2015 and 2016 and (ii) with respect to PQ Holdings Inc. for the years ended December 31, 2013, 2014 and 2015, included in the Registration Statement, the Time of Sale Prospectus and the Prospectus, are each an independent auditor within the applicable rules and regulations adopted by the Commission and the Public Company Accounting Oversight Board (United States) and as required by the Securities Act.

(l) (i) The financial statements, together with the notes thereto, of the Company and its consolidated subsidiaries, and of PQ Holdings Inc. and its consolidated subsidiaries (“**Legacy PQ**”), included in each of the Registration Statement, the Time of Sale Prospectus and the Prospectus comply in all material respects with the applicable requirements of the Securities Act and present fairly in all material respects the consolidated financial position of each of the Company

and Legacy PQ, respectively, as of and at the dates indicated and the results of their operations, comprehensive income, stockholders' equity and cash flows for the periods specified; (ii) the financial statements of each of the Company and Legacy PQ have been prepared in conformity with generally accepted accounting principles as applied in the United States ("U.S. GAAP") applied on a consistent basis throughout the periods involved, except as may be expressly stated in the related notes thereto and except in the case of unaudited financial statements, which are subject to normal year-end adjustments and do not contain certain footnotes as permitted by the applicable rules of the Commission; (iii) the financial data set forth in each of the Registration Statement, the Time of Sale Prospectus and the Prospectus under the captions "Prospectus Summary—Summary Historical and Unaudited Pro Forma Financial and Other Data," "Selected Consolidated Financial Data of PQ Group Holdings" and "Supplemental Selected Consolidated Financial Data of Legacy PQ" fairly present in all material respects the information set forth therein on a basis consistent with that of the audited financial statements contained in the Registration Statement, the Time of Sale Prospectus and the Prospectus; and (iv) the unaudited pro forma condensed combined financial statements and the related notes thereto included under the caption "Unaudited Pro Forma Condensed Combined Financial Information of PQ Group Holdings" and the unaudited pro forma condensed combined financial information included under the caption "Prospectus Summary—Summary Historical and Unaudited Pro Forma Financial and Other Data" and elsewhere in each of the Registration Statement, the Time of Sale Prospectus and the Prospectus present fairly in all material respects the information contained therein, have been prepared in accordance with the Commission's rules, regulations and guidelines with respect to pro forma financial statements and have been properly presented on the bases described therein, and the assumptions used in the preparation thereof are reasonable and the adjustments used therein are appropriate to give effect to the transactions and circumstances referred to therein.

(m) Except as otherwise disclosed in the Time of Sale Prospectus, there has been no material adverse change, nor any prospective development that could reasonably be expected to result in a material adverse change, in the condition, financial or otherwise, business, results of operations, whether or not arising from transactions in the ordinary course of business, of the Company and its subsidiaries, taken as a whole, from that set forth in the Time of Sale Prospectus (any such change is called a "**Material Adverse Change**").

(n) There are no legal or governmental actions, suits or proceedings pending or, to the knowledge of the Company, threatened (i) against or affecting the Company or any of its subsidiaries and, (ii) which has as the subject thereof any property owned or leased by the Company or any of its subsidiaries (a) other than proceedings accurately described in all material respects in the Time of Sale Prospectus and any actions, suits or proceedings, if determined adversely to the Company or any of its subsidiaries, that would not individually or in the aggregate reasonably be expected to result in a Material Adverse Change or adversely affect

the power or ability of the Company to perform its obligations under this Agreement or to consummate the transactions contemplated by the Time of Sale Prospectus or (b) that are required to be described in the Registration Statement, the Time of Sale Prospectus or the Prospectus and are not so described in the Registration Statement, the Time of Sale Prospectus or the Prospectus; and there are no statutes, regulations, contracts or other documents to which the Company is subject or by which the Company is bound that are required to be described in the Registration Statement or the Prospectus or to be filed as exhibits to the Registration Statement that are not described or filed as required.

(o) Each preliminary prospectus filed as part of the registration statement as originally filed or as part of any amendment thereto, or filed pursuant to Rule 424 under the Securities Act, complied when so filed in all material respects with the Securities Act and the applicable rules and regulations of the Commission thereunder.

(p) The Company is not, and after giving effect to the offering and sale of the Shares and the application of the proceeds thereof as described in the Time of Sale Prospectus and the Prospectus will not be, an "investment company" within the meaning of the Investment Company Act of 1940, as amended, and the rules and regulations of the Commission promulgated thereunder.

(q) Except as would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Change: (i) each of the Company and its subsidiaries and their respective operations and facilities is in compliance with applicable Environmental Laws, which compliance includes, without limitation, having obtained and being in compliance with any permits, licenses or other governmental authorizations or approvals, and having made all filings and provided all financial assurances and notices, required for the ownership and operation of the business as presently conducted, or current properties and facilities of the Company and its subsidiaries under applicable Environmental Laws, and compliance with the terms and conditions thereof; (ii) none of the Company nor any of its subsidiaries has received any written communication, whether from a governmental authority, citizens group, employee or other person, that alleges that the Company or its subsidiaries is in violation of any Environmental Law, which communication remains unresolved; (iii) there are no claims pending by any governmental authority or, to the knowledge of the Company, threatened against the Company or any of its subsidiaries, as applicable, alleging actual or potential liability pursuant to any Environmental Law; (iv) none of the Company nor any of its subsidiaries is conducting or paying for, in whole or in part, any public investigation, response or other corrective action pursuant to any Environmental Law at any site or facility, nor is it subject or a party to any order, judgment or decree issued by a governmental authority, or any contract or agreement which imposes any obligation or liability under any Environmental Law; (v) to the knowledge of the Company, no lien, charge, encumbrance or restriction, has been recorded pursuant to any Environmental Law with respect to any assets, facility or property owned or leased by the

Company or any of its subsidiaries, as applicable, which would adversely affect the operation of any such assets, facility or property; and (vi) to the knowledge of the Company, there are no current conditions or occurrences, including, without limitation, the Release or threatened Release of any Material of Environmental Concern, or pending or threatened governmental authority investigations, that could reasonably be expected to result in a violation of or liability under any Environmental Law on the part of the Company or any of its subsidiaries, as applicable, including without limitation, any such liability which the Company or any of its subsidiaries, as applicable, has retained or assumed via indemnity.

For purposes of this Agreement, "Environment" means ambient air, indoor air, surface water, groundwater, drinking water, soil, surface and subsurface strata, and natural resources such as wetlands, flora and fauna. "Environmental Laws" means, to the extent applicable, the common law and all federal, state, local and foreign laws or regulations, ordinances, codes, orders, decrees, judgments and injunctions issued, promulgated or entered thereunder, relating to pollution or protection of the Environment or human health (as it relates to exposure to Materials of Environmental Concern), including without limitation, those relating to (i) the Release or threatened Release of Materials of Environmental Concern; and (ii) the manufacture, processing, distribution, use, generation, treatment, storage, transport, handling or recycling of Materials of Environmental Concern. "Materials of Environmental Concern" means any substance, material, pollutant, contaminant, chemical, waste, compound, or constituent defined as "toxic," "hazardous," a "pollutant," a "contaminant" or words of similar meaning and effect by any applicable Environmental Law, including without limitation, petroleum and petroleum products. "Release" means any release, spill, emission, discharge, deposit, disposal, leaking, pumping, pouring, dumping, emptying, injection or leaching of any Materials of Environmental Concern in, into, onto or through the Environment.

(r) Except as described in the Time of Sale Prospectus and the Prospectus, there are no contracts, agreements or understandings between the Company and any person granting such person the right to require the Company to file a registration statement under the Securities Act with respect to any securities of the Company or to require the Company to include such securities with the Shares registered pursuant to the Registration Statement.

(s) (i) None of the Company or its subsidiaries or affiliates, or any director, officer, or employee thereof, or, to the Company's knowledge, any agent or representative of the Company or of any of its subsidiaries or affiliates, has taken any action in furtherance of an offer, payment, promise to pay, or authorization or approval of the payment, giving or receipt of money, property, gifts or anything else of value, directly or indirectly, to any government official (including any officer or employee of a government or government-owned or controlled entity or of a public international organization, or any person acting in an official capacity for or on behalf of any of the foregoing, or any political party or party official or candidate for political office) ("**Government Official**") in

order to improperly influence official action, or to any person in violation of any applicable anti-corruption laws; (ii) the Company and its subsidiaries and affiliates have conducted their businesses in compliance with applicable anti-corruption laws and have instituted and maintained policies and procedures reasonably designed to promote and achieve compliance with such laws and with the representations and warranties contained herein; and (iii) neither the Company nor its subsidiaries will use, directly or indirectly, the proceeds of the offering in furtherance of an offer, payment, promise to pay, or authorization of the payment or giving of money, or anything else of value, to any person in violation of any applicable anti-corruption laws.

(t) The operations of the Company and its subsidiaries are and have been conducted at all times in material compliance with all applicable financial recordkeeping and reporting requirements, including those of the Bank Secrecy Act, as amended by Title III of the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (USA PATRIOT Act), and the applicable anti-money laundering statutes of jurisdictions where the Company and its subsidiaries conduct business, the rules and regulations thereunder and any related or similar rules, regulations or guidelines, issued, administered or enforced by any governmental agency (collectively, the “**Anti-Money Laundering Laws**”), and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Anti-Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(u) (i) None of the Company, any of its subsidiaries, or any director or officer thereof, or, to the Company’s knowledge, any agent, controlled affiliate, employee or representative of the Company or any of its subsidiaries, is an individual or entity (“**Person**”) that is, or is owned or controlled by one or more Persons that are:

(A) the subject of any sanctions administered or enforced by the U.S. Department of Treasury’s Office of Foreign Assets Control (“**OFAC**”), the United Nations Security Council (“**UNSC**”), the European Union (“**EU**”), Her Majesty’s Treasury (“**HMT**”), or other relevant sanctions authority (collectively, “**Sanctions**”), or

(B) located, organized or resident in a country or territory that is the subject of Sanctions (including, without limitation, Crimea, Cuba, Iran, North Korea, Sudan and Syria).

(ii) The Company will not, directly or indirectly, use the proceeds of the offering, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other Person:

(A) to fund or facilitate any activities or business of or with any Person or in any country or territory that, at the time of such funding or facilitation, is the subject of Sanctions; or

(B) in any other manner that will result in a violation of Sanctions by any Person (including any Person participating in the offering, whether as underwriter, advisor, investor or otherwise).

(iii) The Company and its subsidiaries are not now and for the past five years have not knowingly engaged in any dealings or transactions with any Person, or in any country or territory, that at the time of the dealing or transaction is or was the subject of Sanctions.

(v) Subsequent to the respective dates as of which information is given in each of the Registration Statement, the Time of Sale Prospectus and the Prospectus, (i) the Company and its subsidiaries have not incurred any material liability or obligation, indirect, direct or contingent, not in the ordinary course of business nor entered into any material transaction or agreement not in the ordinary course of business; (ii) the Company has not purchased any of its outstanding capital stock, other than from its employees or other service providers in connection with the termination of their service pursuant to equity compensation plans or agreements described in the Time of Sale Prospectus, nor declared, paid or otherwise made any dividend or distribution of any kind on its capital stock other than ordinary and customary dividends; and (iii) there has not been any material change in the capital stock, short-term debt or long-term debt of the Company and its subsidiaries, except in each case as described in each of the Registration Statement, the Time of Sale Prospectus and the Prospectus, respectively.

(w) Each of the Company and its subsidiaries owns or leases all such properties as are necessary for the conduct of the operations, in all material respects, of their respective businesses as presently conducted. Each of the Company and its subsidiaries has good and marketable title to all the properties and assets reflected as owned in the Company's financial statements, in each case free and clear of any security interests, mortgages, liens, encumbrances, equities, claims and other defects, except as disclosed in the Time of Sale Prospectus or except such as do not materially and adversely affect the value of such property and do not materially interfere with the use made or proposed to be made of such property by the Company and its subsidiaries. The real property and improvements held under lease by the Company and its subsidiaries are held under valid and enforceable leases, with such exceptions as are not material and do not materially interfere with the use made or proposed to be made of such real property or improvements by the Company and its subsidiaries.

(x) The Company and its subsidiaries own or possess or have the right to use the trademarks, trade names, patent rights, copyrights, licenses, trade secrets and other similar rights (collectively, “**Intellectual Property Rights**”) reasonably necessary to conduct their respective businesses as now conducted, free, to the Company’s knowledge, of any infringement of the Intellectual Property Rights of others that would reasonably be expected to result in a Material Adverse Change. The expected expiration of the Company’s Intellectual Property Rights would not reasonably be expected to result in a Material Adverse Change. None of the Company nor any of its subsidiaries have received any notice of infringement or conflict with asserted Intellectual Property Rights of others, which infringement or conflict, if the subject of an unfavorable decision, would reasonably be expected to result in a Material Adverse Change.

(y) No material relationship, direct or indirect, exists between or among, to the knowledge of the Company, the Company or any of its subsidiaries or any controlled affiliate thereof, on the one hand, and any director, officer, member, stockholder, customer or supplier of the Company, any of its subsidiaries or any controlled affiliate thereof, on the other, that is required by (i) U.S. GAAP to be disclosed in the relevant financial statements which is not so disclosed in the Registration Statement, the Time of Sale Prospectus and the Prospectus or (ii) the Securities Act to be described in each of the Registration Statement and the Prospectus and that is not so described in such documents and in the Time of Sale Prospectus.

(z) Except as would not, individually or in the aggregate, result in a Material Adverse Change, (i) there is (A) no unfair labor practice complaint pending or, to the knowledge of the Company, threatened against the Company or any of its subsidiaries before the National Labor Relations Board, and no grievance or arbitration proceeding arising out of or under collective bargaining agreements pending, or to the knowledge of the Company, threatened, against the Company or any of its subsidiaries, as applicable, (B) no strike, labor dispute, slowdown or stoppage pending or, to the knowledge of the Company, threatened against the Company or any of its subsidiaries and (C) no union representation question existing with respect to the employees of the Company or any of its subsidiaries and, to the knowledge of the Company, no union organizing activities taking place and (ii) there has been no violation of any federal, state or local law relating to discrimination in hiring, promotion or pay of employees or of any applicable wage or hour laws.

(aa) The Company and any “employee benefit plan” (as defined under the Employee Retirement Income Security Act of 1974 (as amended, “**ERISA**,” which term, as used herein, includes the applicable regulations thereunder) established or maintained by the Company or any of its subsidiaries or any of the ERISA Affiliates (as defined below) of the Company is in compliance with ERISA except for non-compliance which would not reasonably be expected to result in a Material Adverse Change. “**ERISA Affiliate**” means, with respect to the Company or any of its subsidiaries, any member of any group of organizations described in Section 414(b), (c), (m) or (o) of the Internal Revenue Code of 1986 (as amended, the “**Code**,” which term, as used herein, includes the applicable regulations thereunder) of which the Company or such subsidiary of the Company

is a member. No “reportable event” (as defined in Section 4043 of ERISA) has occurred or is reasonably expected to occur with respect to any “employee benefit plan” established or maintained by the Company or its subsidiaries or any of the ERISA Affiliates of the Company which has resulted or is expected to result in any material liability of the Company or its subsidiaries or any of the ERISA Affiliates of the Company to the Pension Benefit Guaranty Corporation. Except as would not, individually or in the aggregate, result in a Material Adverse Change, none of the Company, any of its subsidiaries, nor any of the ERISA Affiliates of the Company has incurred or reasonably expects to incur any liability under Title IV of ERISA with respect to termination of, or withdrawal from, any employee benefit plan which has not been satisfied in full. Each “employee benefit plan” established or maintained by the Company, its subsidiaries or any of the ERISA Affiliates of the Company that is intended to be qualified under Section 401 of the Code is so qualified and nothing has occurred, whether by action or failure to act, which would cause the loss of such qualification, except for non-compliance which would not reasonably be expected to result in a Material Adverse Change.

(bb) The Company and each of its subsidiaries are insured by recognized, financially sound institutions with policies in such amounts and with such deductibles and covering such risks as are generally deemed adequate and customary for their businesses including, without limitation, policies covering real and personal property owned or leased by the Company and its subsidiaries against theft, damage, destruction, acts of vandalism, flood and earthquakes, except where the failure to do so would not reasonably be expected to have a Material Adverse Change. None of the Company nor any of its subsidiaries has reason to believe that it will not be able (i) to renew its existing insurance coverage as and when such policies expire or (ii) to obtain comparable coverage from similar institutions as may be necessary or appropriate to conduct its business as now conducted and at a cost that would not result in a Material Adverse Change.

(cc) The Company and its subsidiaries possess valid and current certificates, authorizations or permits issued by the appropriate state, federal or foreign regulatory agencies or bodies necessary to own, lease and operate their respective properties and to conduct their respective businesses, and neither the Company nor any of its subsidiaries has received any notice of proceedings relating to the revocation or modification of, or non-compliance with, any such certificate, authorization or permit which, individually or in the aggregate, the failure to possess or the subject of an unfavorable decision, ruling or finding in such a proceeding, would reasonably be expected to result in a Material Adverse Change.

(dd) The Company and each of its consolidated subsidiaries have designed a system of “disclosure controls and procedures” (as defined in Rule 13a-15(c) of the Exchange Act) that will comply with the requirements of the Exchange Act within the time period required and has been designed to ensure

that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms, including controls and procedures designed to ensure that such information is accumulated and communicated to the Company's management as appropriate to allow timely decisions regarding required disclosure.

(ee) The Company and each of its consolidated subsidiaries maintains a system of internal accounting controls that is sufficient to provide reasonable assurances that (i) transactions are executed in accordance with management's general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with U.S. GAAP, and to maintain accountability for assets; (iii) access to assets is permitted only in accordance with management's general or specific authorization; and (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Except as described in the Time of Sale Prospectus, since the end of the Company's most recent audited fiscal year, there has been (i) no material weakness in the Company's internal control over financial reporting (whether or not remediated) and (ii) no change in the Company's internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

(ff) Except as described in the Time of Sale Prospectus or the Registration Statement, the Company has not sold, issued or distributed any shares of Common Stock during the six-month period preceding the date hereof, including any sales pursuant to Rule 144A under, or Regulation D or S of, the Securities Act, other than shares issued pursuant to employee benefit plans, qualified stock option plans or other employee compensation plans or pursuant to outstanding options, rights or warrants.

(gg) Except as would not, singly or in the aggregate, reasonably be expected to have a Material Adverse Change, the Company and each of its subsidiaries have filed all necessary federal, state and foreign income, franchise and other material tax returns and have paid all taxes required to be paid by any of them and, if due and payable, any related or similar assessment, fine or penalty levied against any of them, except as may be contested in good faith and by appropriate proceedings and as to which adequate reserves have been established in accordance with U.S. GAAP. The Company has made adequate charges, accruals and reserves in all material respects in accordance with U.S. GAAP in the applicable financial statements in respect of all federal, state and foreign income, franchise and other material taxes for all periods as to which its tax liability or that of any of the Company's consolidated subsidiaries has not been finally determined.

(hh) As of the time of each sale of the Shares in connection with the offering when the Prospectus is not yet available to prospective purchasers, none of (A) the Time of Sale Prospectus and (B) any free writing prospectus, when considered together with the Time of Sale Prospectus, included, includes or will include an untrue statement of a material fact or omitted, omits or will omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation and warranty with respect to any statements or omissions in the Time of Sale Prospectus or any free writing prospectus based on information relating to any Underwriter furnished to the Company in writing by such Underwriter through or on behalf of the Representatives for use therein.

(ii) The statistical, industry and market-related data included in the Registration Statement, the Time of Sale Prospectus and the Prospectus are based on or derived from sources that the Company believes to be reliable and accurate in all material respects and represent their good faith estimates that are made on the basis of data derived from such sources.

(jj) Neither the Company nor any of its subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against the Company or any of its subsidiaries or any Underwriter for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Shares.

(kk) None of the Company nor its affiliates has taken, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of the Shares to facilitate the sale or resale of the Shares.

(ll) There is and has been no failure on the part of the Company, or to the knowledge of the Company, any of the Company's directors or officers, in their capacities as such, to comply with any provision of the Sarbanes-Oxley Act of 2002, as amended and the rules and regulations promulgated in connection therewith, including Section 402 related to loans, to the extent compliance is required as of the date of this Agreement.

2. Agreements to Sell and Purchase. The Company hereby agrees to sell to the several Underwriters, and each Underwriter, upon the basis of the representations and warranties herein contained, but subject to the conditions hereinafter stated, agrees, severally and not jointly, to purchase from the Company the respective numbers of Firm Shares set forth in Schedule I hereto opposite its name at \$[] a share (the "**Purchase Price**").

On the basis of the representations and warranties contained in this Agreement, and subject to its terms and conditions, the Company agrees to sell to the Underwriters the Additional Shares, and the Underwriters shall have the right to purchase, severally and not jointly, up to [] Additional Shares at the Purchase Price, provided, however, that the amount paid by the Underwriters for any Additional Shares shall be reduced by

an amount per share equal to any dividends declared by the Company and payable on the Firm Shares but not payable on such Additional Shares. You may exercise this right on behalf of the Underwriters in whole or from time to time in part by giving written notice not later than 30 days after the date of this Agreement. Any exercise notice shall specify the number of Additional Shares to be purchased by the Underwriters and the date on which such shares are to be purchased. Each purchase date must be at least one business day after the written notice is given and may not be earlier than the closing date for the Firm Shares nor later than ten business days after the date of such notice. Additional Shares may be purchased as provided in Section 4 hereof solely for the purpose of covering sales of shares in excess of the number of the Firm Shares. On each day, if any, that Additional Shares are to be purchased (an “**Option Closing Date**”), each Underwriter agrees, severally and not jointly, to purchase the number of Additional Shares (subject to such adjustments to eliminate fractional shares as you may determine) that bears the same proportion to the total number of Additional Shares to be purchased on such Option Closing Date as the number of Firm Shares set forth in Schedule I hereto opposite the name of such Underwriter bears to the total number of Firm Shares.

3. *Terms of Public Offering.* The Company is advised by you that the Underwriters propose to make a public offering of their respective portions of the Shares as soon after the Registration Statement and this Agreement have become effective as in your judgment is advisable. The Company is further advised by you that the Shares are to be offered to the public initially at \$[] a share (the “**Public Offering Price**”) and to certain dealers selected by you at a price that represents a concession not in excess of \$[] a share under the Public Offering Price, and that any Underwriter may allow, and such dealers may realow, a concession, not in excess of \$[] a share, to any Underwriter or to certain other dealers.

4. *Payment and Delivery.* Payment for the Firm Shares shall be made to the Company in Federal or other funds immediately available in New York City against delivery of such Firm Shares for the respective accounts of the several Underwriters at approximately 10:00 a.m., New York City time, on [], 2017, or at such other time on the same or such other date, not later than [], 2017, as shall be designated in writing by you. The time and date of such payment are hereinafter referred to as the “**Closing Date**.”

Payment for any Additional Shares shall be made to the Company in Federal or other funds immediately available in New York City against delivery of such Additional Shares for the respective accounts of the several Underwriters at approximately 10:00 a.m., New York City time, on the date specified in the corresponding notice described in Section 2 or at such other time on the same or on such other date, in any event not later than [], 2017, as shall be designated in writing by you.

The Firm Shares and Additional Shares shall be registered in such names and in such denominations as you shall request in writing not later than one full business day prior to the Closing Date or the applicable Option Closing Date, as the case may be. The Firm Shares and Additional Shares shall be delivered to you on the Closing Date or an Option Closing Date, as the case may be, for the respective accounts of the several Underwriters, with any transfer taxes payable in connection with the transfer of the Shares to the Underwriters duly paid, against payment of the Purchase Price therefor.

5. *Conditions to the Underwriters' Obligations.* The obligations of the Company to sell the Shares to the Underwriters and the several obligations of the Underwriters to purchase and pay for the Shares on the Closing Date are subject to the condition that the Registration Statement shall have become effective not later than [] [a.][p.]m. (New York City time) on the date hereof.

The several obligations of the Underwriters are subject to the following further conditions:

(a) No order suspending the effectiveness of the Registration Statement shall be in effect, and no proceeding for such purpose or pursuant to Section 8A under the Securities Act shall be pending before or threatened by the Commission; the Prospectus and each free writing prospectus shall have been timely filed with the Commission under the Securities Act (in the case of a free writing prospectus, to the extent required by Rule 433 under the Securities Act) and in accordance with Section 6 hereof.

(b) The representations and warranties of the Company contained herein shall be true and correct on the date hereof and on and as of the Closing Date;

(c) Subsequent to the execution and delivery of this Agreement and prior to the Closing Date:

(i) there shall not have occurred any downgrading, nor shall any notice have been given of any intended or potential downgrading or of any review for a possible change that does not indicate the direction of the possible change, in the rating accorded any of the securities of the Company or any of its subsidiaries by any "nationally recognized statistical rating organization," as such term is defined in Section 3(a)(62) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"); and

(ii) there shall not have occurred any change, or any development involving a prospective change, in the condition, financial or otherwise, or in the earnings, business or operations of the Company and its subsidiaries, taken as a whole, from that set forth in the Time of Sale Prospectus that, in your judgment, is material and adverse and that makes it, in your judgment, impracticable to market the Shares on the terms and in the manner contemplated in the Time of Sale Prospectus.

(d) The Underwriters shall have received on the Closing Date a certificate, dated the Closing Date and signed by an executive officer of the Company, to the effect set forth in Section 5(c)(i) above and to the effect that the representations and warranties of the Company contained in this Agreement are true and correct as of the Closing Date and that the Company has complied in all material respects with all of the agreements and satisfied all of the conditions on its part to be performed or satisfied hereunder on or before the Closing Date.

The officer signing and delivering such certificate may rely upon his or her knowledge as to proceedings threatened.

(e) The Underwriters shall have received on the Closing Date an opinion and a negative assurance letter of Ropes & Gray LLP, outside counsel for the Company, dated the Closing Date, in each case in form and substance reasonably satisfactory to you.

(f) The Underwriters shall have received on the Closing Date an opinion of the General Counsel for the Company, dated the Closing Date, in form and substance reasonably satisfactory to you.

(g) The Underwriters shall have received on the Closing Date an opinion and a negative assurance letter of Latham & Watkins LLP, counsel for the Underwriters, dated the Closing Date, in each case in form and substance reasonably satisfactory to you.

With respect to Section 5(e) and Section 5(g) above, Ropes & Gray LLP and Latham & Watkins LLP may state that their opinions and beliefs are based upon their participation in the preparation of the Registration Statement, the Time of Sale Prospectus and the Prospectus and any amendments or supplements thereto and review and discussion of the contents thereof, but are without independent check or verification, except as specified.

The opinion of Ropes & Gray LLP described in Section 5(e) above shall be rendered to the Underwriters at the request of the Company and shall so state therein.

(h) The Underwriters shall have received, on each of the date hereof and the Closing Date, a letter dated the date hereof or the Closing Date, as the case may be, in form and substance satisfactory to the Underwriters, from each of (i) PwC and (ii) Deloitte, independent public accountants, containing statements and information of the type ordinarily included in accountants' "comfort letters" to underwriters with respect to the financial statements and certain financial information contained in the Registration Statement, the Time of Sale Prospectus and the Prospectus; *provided* that the letter delivered on the Closing Date shall use a "cut-off date" not earlier than the date hereof.

(i) The Underwriters shall have received, on each of the date hereof and the Closing Date, a certificate dated the date hereof or the Closing Date, as the case may be, and signed by the Chief Financial Officer of the Company, containing statements and information with respect to certain financial information contained in the Registration Statement, the Time of Sale Prospectus and the Prospectus.

(j) The “lock-up” agreements, each substantially in the form of Exhibit A hereto, between you and certain shareholders, officers and directors of the Company relating to sales and certain other dispositions of shares of Common Stock or certain other securities, delivered to you on or before the date hereof, shall be in full force and effect on the Closing Date.

(k) The Underwriters shall have received on the Closing Date such other documents as they may reasonably request with respect to the good standing of the Company and its significant subsidiaries, the due authorization and issuance of the Shares to be sold on the Closing Date and other matters related to the issuance of such Shares.

(l) The several obligations of the Underwriters to purchase Additional Shares hereunder are subject to the satisfaction of the conditions set forth in Sections 5(a), 5(b) and 5(c) above as of the applicable Option Closing Date and the delivery to you on such Option Closing Date of the following:

(i) a certificate, dated the Option Closing Date and signed by an executive officer of the Company, confirming that the certificate delivered on the Closing Date pursuant to Section 5(d) hereof remains true and correct as of such Option Closing Date;

(ii) an opinion of Ropes & Gray LLP, outside counsel for the Company, dated the Option Closing Date, relating to the Additional Shares to be purchased on such Option Closing Date and otherwise to the same effect as the opinion required by Section 5(e) hereof;

(iii) an opinion of the General Counsel for the Company, dated the Option Closing Date, relating to the Additional Shares to be purchased on such Option Closing Date and otherwise to the same effect as the opinion required by Section 5(f) hereof;

(iv) an opinion of Latham & Watkins LLP, counsel for the Underwriters, dated the Option Closing Date, relating to the Additional Shares to be purchased on such Option Closing Date and otherwise to the same effect as the opinion required by Section 5(g) hereof;

(v) a letter dated the Option Closing Date, in form and substance satisfactory to the Underwriters, from each of (i) PwC and (ii) Deloitte, independent public accountants, substantially in the same form and substance as the letter furnished to the Underwriters pursuant to Section 5(h) hereof; *provided* that the letter delivered on the Option Closing Date shall use a “cut-off date” not earlier than three business days prior to such Option Closing Date;

(vi) a certificate dated the Option Closing Date, signed by the Chief Financial Officer of the Company, substantially in the same form and substance as the certificate delivered to the Underwriters pursuant to Section 5(i) hereof; and

(vii) such other documents as you may reasonably request with respect to the good standing of the Company and its significant subsidiaries, the due authorization and issuance of the Additional Shares to be sold on such Option Closing Date and other matters related to the issuance of such Additional Shares.

6. *Covenants of the Company.* The Company covenants with each Underwriter as follows:

(a) To furnish to you, without charge and upon request, three signed copies of the Registration Statement (including exhibits thereto) and for delivery to each other Underwriter a conformed copy of the Registration Statement (without exhibits thereto) and to furnish to you in New York City, without charge, prior to 10:00 a.m. New York City time on the business day next succeeding the date of this Agreement and during the period mentioned in Section 6(f) or 6(g) below, as many copies of the Time of Sale Prospectus, the Prospectus and any supplements and amendments thereto or to the Registration Statement as you may reasonably request.

(b) Before amending or supplementing the Registration Statement, the Time of Sale Prospectus or the Prospectus, to furnish to you a copy of each such proposed amendment or supplement and not to file any such proposed amendment or supplement to which you reasonably object in writing, and in a timely manner, to Ropes & Gray LLP, and to file with the Commission within the applicable period specified in Rule 424(b) under the Securities Act any prospectus required to be filed pursuant to such Rule.

(c) To furnish to you a copy of each proposed free writing prospectus to be prepared by or on behalf of, used by, or referred to by the Company and not to use or refer to any proposed free writing prospectus to which you reasonably object.

(d) Not to take any action that would result in an Underwriter or the Company being required to file with the Commission pursuant to Rule 433(d) under the Securities Act a free writing prospectus prepared by or on behalf of the Underwriter that the Underwriter otherwise would not have been required to file thereunder.

(e) To advise the Representatives promptly, (i) when the Registration Statement has become effective; (ii) when any amendment to the Registration Statement has been filed or becomes effective; (iii) when any supplement to the Prospectus or any free writing prospectus or any amendment to the Prospectus has

been filed or distributed; (iv) of any request by the Commission for any amendment to the Registration Statement or any amendment or supplement to the Prospectus or the receipt of any comments from the Commission relating to the Registration Statement or any other request by the Commission for additional information; (v) of the issuance by the Commission or any other governmental or regulatory authority of any order suspending the effectiveness of the Registration Statement or preventing or suspending the use of any preliminary prospectus, the Time of Sale Prospectus or the Prospectus or the initiation or threatening of any proceeding for that purpose or pursuant to Section 8A of the Securities Act; and (vi) of the receipt by the Company of any notice with respect to any suspension of the qualification of the Shares for offer and sale in any jurisdiction or the initiation or threatening of any proceeding for such purpose; and to use its reasonable best efforts to prevent the issuance of any such order suspending the effectiveness of the Registration Statement, preventing or suspending the use of any preliminary prospectus, the Time of Sale Prospectus or the Prospectus or suspending any such qualification of the Shares and, if any such order is issued, will obtain as soon as possible the withdrawal thereof.

(f) If the Time of Sale Prospectus is being used to solicit offers to buy the Shares at a time when the Prospectus is not yet available to prospective purchasers and any event shall occur or condition exist as a result of which it is necessary to amend or supplement the Time of Sale Prospectus in order to make the statements therein, in the light of the circumstances, not misleading, or if any event shall occur or condition exist as a result of which the Time of Sale Prospectus conflicts with the information contained in the Registration Statement then on file, or if, in the reasonable opinion of counsel for the Underwriters, it is necessary to amend or supplement the Time of Sale Prospectus to comply with applicable law, forthwith, subject to Section 6(b) above, to prepare, file with the Commission and furnish, at its own expense, to the Underwriters and to any dealer upon request, either amendments or supplements to the Time of Sale Prospectus so that the statements in the Time of Sale Prospectus as so amended or supplemented will not, in the light of the circumstances when the Time of Sale Prospectus is delivered to a prospective purchaser, be misleading or so that the Time of Sale Prospectus, as amended or supplemented, will no longer conflict with the Registration Statement, or so that the Time of Sale Prospectus, as amended or supplemented, will comply with applicable law.

(g) If, during such period after the first date of the public offering of the Shares as in the reasonable opinion of counsel for the Underwriters the Prospectus (or in lieu thereof the notice referred to in Rule 173(a) of the Securities Act) is required by law to be delivered in connection with sales by an Underwriter or dealer, any event shall occur or condition exist as a result of which it is necessary to amend or supplement the Prospectus in order to make the statements therein, in the light of the circumstances when the Prospectus (or in lieu thereof the notice referred to in Rule 173(a) of the Securities Act) is delivered to a purchaser, not misleading, or if, in the reasonable opinion of counsel for the Underwriters, it is necessary to amend or supplement the Prospectus to comply

with applicable law, forthwith, subject to Section 6(b) above, to prepare, file with the Commission and furnish, at its own expense, to the Underwriters and to the dealers (whose names and addresses you will furnish to the Company) to which Shares may have been sold by you on behalf of the Underwriters and to any other dealers upon request, either amendments or supplements to the Prospectus so that the statements in the Prospectus as so amended or supplemented will not, in the light of the circumstances when the Prospectus (or in lieu thereof the notice referred to in Rule 173(a) of the Securities Act) is delivered to a purchaser, be misleading or so that the Prospectus, as amended or supplemented, will comply with applicable law.

(h) To use its commercially reasonable efforts to qualify the Shares for offer and sale under the securities or Blue Sky laws of such jurisdictions as you shall reasonably request; provided, however, that nothing contained herein shall require the Company to qualify to do business in any jurisdiction, to execute a general consent to service of process in any jurisdiction or to subject itself to taxation in any jurisdiction in which it is not otherwise subject.

(i) To make generally available to the Company's security holders and to you as soon as practicable an earnings statement covering a period of at least twelve months beginning with the first fiscal quarter of the Company occurring after the date of this Agreement which shall satisfy the provisions of Section 11(a) of the Securities Act and the rules and regulations of the Commission thereunder; provided that the Company will be deemed to have furnished such statement to its security holders to the extent it is filed on the Commission's Electronic Data Gathering, Analysis and Retrieval system ("**EDGAR**").

(j) Whether or not the transactions contemplated in this Agreement are consummated or this Agreement is terminated, to pay or cause to be paid all expenses incident to the performance of its obligations under this Agreement, including: (i) the fees, disbursements and expenses of the Company's counsel and the Company's accountants in connection with the registration and delivery of the Shares under the Securities Act and all other fees or expenses in connection with the preparation and filing of the Registration Statement, any preliminary prospectus, the Time of Sale Prospectus, the Prospectus, any free writing prospectus prepared by or on behalf of, used by, or referred to by the Company and amendments and supplements to any of the foregoing, including all printing costs associated therewith, and the mailing and delivering of copies thereof to the Underwriters and dealers, in the quantities hereinabove specified, (ii) all costs and expenses related to the transfer and delivery of the Shares to the Underwriters, including any transfer or other taxes payable thereon, (iii) the cost of printing or producing any Blue Sky or Legal Investment memorandum in connection with the offer and sale of the Shares under state securities laws and all expenses in connection with the qualification of the Shares for offer and sale under state securities laws as provided in Section 6(h) hereof, including filing fees and the reasonable and documented fees and disbursements of counsel for the

Underwriters (not to exceed \$10,000) in connection with such qualification and in connection with the Blue Sky or Legal Investment memorandum, (iv) all filing fees and the reasonable and documented fees and disbursements of counsel to the Underwriters (not to exceed \$25,000) incurred in connection with the review and qualification of the offering of the Shares by the Financial Industry Regulatory Authority, (v) all fees and expenses in connection with the preparation and filing of the registration statement on Form 8-A relating to the Common Stock and all costs and expenses incident to listing the Shares on the NYSE, (vi) the cost of printing certificates representing the Shares, (vii) the costs and charges of any transfer agent, registrar or depository, (viii) the costs and expenses of the Company relating to investor presentations on any "road show" undertaken in connection with the marketing of the offering of the Shares, including, without limitation, expenses associated with the preparation or dissemination of any electronic road show, expenses associated with the production of road show slides and graphics, fees and expenses of any consultants engaged by the Company in connection with the road show presentations, travel and lodging expenses of the officers and consultants of the Company, and one-half of the cost of any aircraft chartered in connection with the road show (the remaining half of the cost to be paid by the Underwriters), (ix) the document production charges and expenses associated with printing this Agreement and (x) all other costs and expenses incident to the performance of the obligations of the Company hereunder for which provision is not otherwise made in this Section. It is understood, however, that except as provided in this Section 6, Section 8 and Section 11 below, the Underwriters will pay all of their costs and expenses, including fees and disbursements of their counsel, travel and lodging expenses of the Underwriters (except as otherwise specifically set forth in clause (viii) of this paragraph with respect to the costs related to chartered aircraft, if any), stock transfer taxes payable on resale of any of the Shares by them and any advertising expenses connected with any offers they may make.

(k) Not to take, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of the Shares to facilitate the sale or resale of the Shares.

The Company also covenants with each Underwriter that, without the prior written consent of the Representatives, on behalf of the Underwriters, it will not, during the period ending 180 days after the date of the Prospectus (the "**Restricted Period**"), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock or (2) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the Common Stock, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of Common Stock or such other securities, in cash or otherwise or (3) file any registration statement with the Commission relating to the offering of any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock.

The restrictions contained in the preceding paragraph shall not apply to (a) the Shares to be sold hereunder, (b) the issuance by the Company of shares of Common Stock upon the exercise of an option or warrant or the conversion of a security outstanding on the date hereof, (c) the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of Common Stock, *provided* that (i) such plan does not provide for the transfer of Common Stock during the Restricted Period and (ii) to the extent a public announcement or filing under the Exchange Act, if any, is required of or voluntarily made by the Company regarding the establishment of such plan, such announcement or filing shall include a statement to the effect that no transfer of Common Stock may be made under such plan during the Restricted Period, (d) any stock based awards granted under Company employee benefit plans described in the Prospectus, (e) filings on Form S-8 relating to the Company employee benefit plans described in the Prospectus and (f) the entry into an agreement providing for the issuance of Common Stock or any securities convertible into or exercisable for Common Stock, and the issuance of any such securities pursuant to such an agreement, in connection with (i) the acquisition by the Company or any of its subsidiaries of the securities, business, property or other assets of another person or entity, including pursuant to an employee benefit plan assumed by the Company in connection with such acquisition, or (ii) joint ventures, commercial relationships or other strategic transactions, *provided* that the aggregate number of shares of Common Stock issued or issuable pursuant to this clause (f) shall not exceed 5% of the total number of shares of Common Stock issued and outstanding immediately following the offering of the Shares pursuant to this Agreement and provided further that the Company shall cause each recipient of such shares to execute and deliver to the Representatives, on or prior to such issuance, a “lock-up” agreement, substantially in the form of Exhibit A hereto.

If the Representatives, in their sole discretion, agrees to release or waive the restrictions set forth in a lock-up letter described in Section 5(j) hereof for an officer or director of the Company and provides the Company with notice of the impending release or waiver at least three business days before the effective date of the release or waiver, the Company agrees to announce the impending release or waiver by a press release substantially in the form of Exhibit B hereto through a major news service at least two business days before the effective date of the release or waiver.

7. *Covenants of the Underwriters.* Each Underwriter severally covenants with the Company not to take any action that would result in the Company being required to file with the Commission under Rule 433(d) a free writing prospectus prepared by or on behalf of such Underwriter that otherwise would not be required to be filed by the Company thereunder, but for the action of the Underwriter.

8. *Indemnity and Contribution.* (a) The Company agrees to indemnify and hold harmless each Underwriter, each person, if any, who controls any Underwriter within the meaning of either Section 15 of the Securities Act or Section 20 of the Exchange Act and each director, officer and affiliate of any Underwriter within the meaning of Rule 405 under the Securities Act from and against any and all losses, claims, damages and liabilities (including, without limitation, any legal or other expenses reasonably incurred in connection with defending or investigating any such action or

claim) caused by any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement or any amendment thereof, any preliminary prospectus, the Time of Sale Prospectus or any amendment or supplement thereto, any issuer free writing prospectus as defined in Rule 433(h) under the Securities Act, any Company information that the Company has filed, or is required to file, pursuant to Rule 433(d) under the Securities Act, any road show as defined in Rule 433(h) under the Securities Act (a "road show"), or the Prospectus or any amendment or supplement thereto, caused by, (i) in the case of any preliminary prospectus, the Time of Sale Prospectus or any amendment or supplement thereto, any issuer free writing prospectus as defined in Rule 433(h) under the Securities Act, any Company information that the Company has filed, or is required to file, pursuant to Rule 433(d) under the Securities Act, or any road show, any omission or alleged omission to state therein a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading, and (ii) in the case of the Registration Statement or any amendment thereof, any omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case except insofar as such losses, claims, damages or liabilities are caused by any such untrue statement or omission or alleged untrue statement or omission based upon information relating to any Underwriter furnished to the Company in writing by or on behalf of such Underwriter or through you expressly for use therein. [The Company agrees and confirms that references to "affiliates" of Morgan Stanley & Co. LLC that appear in this Agreement shall be understood to include Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.]

(b) Each Underwriter agrees, severally and not jointly, to indemnify and hold harmless the Company, its directors, its officers who sign the Registration Statement and each person, if any, who controls the Company within the meaning of either Section 15 of the Securities Act or Section 20 of the Exchange Act to the same extent as the foregoing indemnity from the Company to such Underwriter, but only with reference to information relating to such Underwriter furnished to the Company in writing by or on behalf of such Underwriter or through you expressly for use therein, it being understood and agreed upon that the only such information furnished consists of the following information in the Prospectus: [].

(c) In case any proceeding (including any governmental investigation) shall be instituted involving any person in respect of which indemnity may be sought pursuant to Section 8(a) or 8(b), such person (the "**indemnified party**") shall promptly notify the person against whom such indemnity may be sought (the "**indemnifying party**") in writing and the indemnifying party, upon request of the indemnified party, shall retain counsel reasonably satisfactory to the indemnified party to represent the indemnified party and any others the indemnifying party may designate in such proceeding and shall pay the reasonable fees and disbursements of such counsel related to such proceeding. In any such proceeding, any indemnified party shall have the right to retain its own counsel, but the fees and expenses of such counsel shall be at the expense of such indemnified party unless (i) the indemnifying party and the indemnified party

shall have mutually agreed to the retention of such counsel, (ii) the named parties to any such proceeding (including any impleaded parties) include both the indemnifying party and the indemnified party and representation of both parties by the same counsel would be inappropriate due to actual or potential differing interests between them or (iii) the indemnifying party has failed within a reasonable time to retain counsel reasonably satisfactory to the indemnified party. It is understood that the indemnifying party shall not, in respect of the legal expenses of any indemnified party in connection with any proceeding or related proceedings in the same jurisdiction, be liable for the fees and expenses of more than one separate firm (in addition to any local counsel) for all such indemnified parties and that all such fees and expenses shall be reimbursed as they are incurred. Such firm shall be designated in writing by the Representatives, in the case of parties indemnified pursuant to Section 8(a), and by the Company, in the case of parties indemnified pursuant to Section 8(b). The indemnifying party shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the indemnifying party agrees to indemnify the indemnified party from and against any loss or liability by reason of such settlement or judgment. No indemnifying party shall, without the prior written consent of the indemnified party, effect any settlement of any pending or threatened proceeding in respect of which any indemnified party is or could have been a party and indemnity could have been sought hereunder by such indemnified party, unless such settlement includes (i) an unconditional release of such indemnified party from all liability on claims that are the subject matter of such proceeding and (ii) does not include a statement as to or an admission of fault, culpability or a failure to act, by or on behalf of any indemnified party.

(d) To the extent the indemnification provided for in Section 8(a) or 8(b) is unavailable to an indemnified party or insufficient in respect of any losses, claims, damages or liabilities referred to therein (other than as a result of the limitation on indemnification provided for therein), then each indemnifying party under such paragraph, in lieu of indemnifying such indemnified party thereunder, shall contribute to the amount paid or payable by such indemnified party as a result of such losses, claims, damages or liabilities (i) in such proportion as is appropriate to reflect the relative benefits received by the Company on the one hand and the Underwriters on the other hand from the offering of the Shares or (ii) if the allocation provided by clause 8(d)(i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause 8(d)(i) above but also the relative fault of the Company on the one hand and of the Underwriters on the other hand in connection with the statements or omissions that resulted in such losses, claims, damages or liabilities, as well as any other relevant equitable considerations. The relative benefits received by the Company on the one hand and the Underwriters on the other hand in connection with the offering of the Shares shall be deemed to be in the same respective proportions as the net proceeds from the offering of the Shares (before deducting expenses) received by the Company and the total underwriting discounts and commissions received by the Underwriters, in each

case as set forth in the table on the cover of the Prospectus, bear to the aggregate Public Offering Price of the Shares. The relative fault of the Company on the one hand and the Underwriters on the other hand shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or by the Underwriters and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission. The Underwriters' respective obligations to contribute pursuant to this Section 8 are several in proportion to the respective number of Shares they have purchased hereunder, and not joint.

(e) The Company and the Underwriters agree that it would not be just or equitable if contribution pursuant to this Section 8 were determined by *pro rata* allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation that does not take account of the equitable considerations referred to in Section 8(d). The amount paid or payable by an indemnified party as a result of the losses, claims, damages and liabilities referred to in Section 8(d) shall be deemed to include, subject to the limitations set forth above, any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending any such action or claim. Notwithstanding the provisions of this Section 8, no Underwriter shall be required to contribute any amount in excess of the amount by which the total price at which the Shares that were underwritten by it were offered to the public exceeds the amount of any damages that such Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The remedies provided for in this Section 8 are not exclusive and shall not limit any rights or remedies which may otherwise be available to any indemnified party at law or in equity.

(f) The indemnity and contribution provisions contained in this Section 8 and the representations, warranties and other statements of the Company contained in this Agreement and the agreements regarding expense reimbursement shall remain operative and in full force and effect regardless of (i) any termination of this Agreement, (ii) any investigation made by or on behalf of any Underwriter, any person controlling any Underwriter or any director, officer or affiliate of any Underwriter or by or on behalf of the Company, its officers or directors or any person controlling the Company and (iii) acceptance of and payment for any of the Shares.

9. [RESERVED]

10. *Termination.* The Underwriters may terminate this Agreement by notice given by you to the Company, if after the execution and delivery of this Agreement and prior to the Closing Date (i) trading generally shall have been suspended or materially limited on, or by, as the case may be, either of the New York Stock Exchange or the NASDAQ Global Market, (ii) trading of any securities of the Company shall have been suspended on any exchange or in any over-the-counter market, (iii) a material disruption in securities settlement, payment or clearance services in the United States shall have occurred, (iv) any moratorium on commercial banking activities shall have been declared by Federal or New York State authorities or (v) there shall have occurred any outbreak or escalation of hostilities, or any change in financial markets or any calamity or crisis that, in the Representatives' judgment, is material and adverse and which, singly or together with any other event specified in this clause (v), makes it, in the Representatives' judgment, impracticable or inadvisable to proceed with the offer, sale or delivery of the Shares on the terms and in the manner contemplated in the Time of Sale Prospectus or the Prospectus.

11. *Effectiveness; Defaulting Underwriters.* This Agreement shall become effective upon the execution and delivery hereof by the parties hereto.

If, on the Closing Date or an Option Closing Date, as the case may be, any one or more of the Underwriters shall fail or refuse to purchase Shares that it has or they have agreed to purchase hereunder on such date, and the aggregate number of Shares which such defaulting Underwriter or Underwriters agreed but failed or refused to purchase is not more than one-tenth of the aggregate number of the Shares to be purchased on such date, the other Underwriters shall be obligated severally in the proportions that the number of Firm Shares set forth opposite their respective names in Schedule I bears to the aggregate number of Firm Shares set forth opposite the names of all such non-defaulting Underwriters, or in such other proportions as you may specify, to purchase the Shares which such defaulting Underwriter or Underwriters agreed but failed or refused to purchase on such date; *provided* that in no event shall the number of Shares that any Underwriter has agreed to purchase pursuant to this Agreement be increased pursuant to this Section 11 by an amount in excess of one-ninth of such number of Shares without the written consent of such Underwriter. If, on the Closing Date, any Underwriter or Underwriters shall fail or refuse to purchase Firm Shares and the aggregate number of Firm Shares with respect to which such default occurs is more than one-tenth of the aggregate number of Firm Shares to be purchased on such date, and arrangements satisfactory to you and the Company for the purchase of such Firm Shares are not made within 36 hours after such default, this Agreement shall terminate without liability on the part of any non-defaulting Underwriter or the Company, except that the provisions of Section 8 hereof shall not terminate and shall remain in effect. In any such case either you or the Company shall have the right to postpone the Closing Date, but in no event for longer than seven days, in order that the required changes, if any, in the Registration Statement, in the Time of Sale Prospectus, in the Prospectus or in any other documents or arrangements may be effected. If, on an Option Closing Date, any Underwriter or Underwriters shall fail or refuse to purchase Additional Shares and the aggregate number of Additional Shares with respect to which such default occurs is more than one-tenth of the aggregate number of Additional Shares to be purchased on such Option Closing Date, the non-defaulting Underwriters shall have the option to (i) terminate their obligation hereunder to purchase the Additional Shares to be sold on such Option Closing Date or (ii) purchase not less than the number of Additional Shares that such non-defaulting Underwriters would have been obligated to purchase in the absence of such default. Any action taken under this paragraph shall not relieve any defaulting Underwriter from liability in respect of any default of such Underwriter under this Agreement.

If this Agreement shall be terminated by the Underwriters, or any of them, pursuant to Section 10(ii) hereof or because of any failure or refusal on the part of the Company to comply with the terms or to fulfill any of the conditions of this Agreement, or if for any reason the Company shall be unable to perform its obligations under this Agreement, the Company will reimburse the Underwriters or such Underwriters as have so terminated this Agreement with respect to themselves, severally, for all out-of-pocket expenses (including the reasonable and documented fees and disbursements of their counsel) reasonably incurred by such Underwriters in connection with this Agreement or the offering contemplated hereunder.

12. *Entire Agreement.* (a) This Agreement, together with any contemporaneous written agreements and any prior written agreements (to the extent not superseded by this Agreement) that relate to the offering of the Shares, represents the entire agreement between the Company and the Underwriters with respect to the preparation of any preliminary prospectus, the Time of Sale Prospectus, the Prospectus, the conduct of the offering, and the purchase and sale of the Shares.

(b) The Company acknowledges that in connection with the offering of the Shares: (i) the Underwriters have acted at arms length, are not agents of, and owe no fiduciary duties to, the Company or any other person, (ii) the Underwriters owe the Company only those duties and obligations set forth in this Agreement and (iii) the Underwriters may have interests that differ from those of the Company. The Company waives to the full extent permitted by applicable law any claims it may have against the Underwriters arising from an alleged breach of fiduciary duty in connection with the offering of the Shares.

13. *Counterparts.* This Agreement may be signed in two or more counterparts, each of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument.

14. *Applicable Law.* This Agreement and any claim, controversy or dispute arising under or related to this Agreement shall be governed by and construed in accordance with the internal laws of the State of New York.

15. *Headings.* The headings of the sections of this Agreement have been inserted for convenience of reference only and shall not be deemed a part of this Agreement.

16. *Notices.* All communications hereunder shall be in writing and effective only upon receipt and if to the Underwriters shall be delivered, mailed or sent to the Representatives at (i) Morgan Stanley & Co. LLC, 1585 Broadway, New York, New York 10036, Attention: Equity Syndicate Desk, with a copy to the Legal Department and (ii) Goldman Sachs & Co. LLC, 200 West Street, New York, New York 10282, Attention: Registration Department; and if to the Company shall be delivered, mailed or sent to PQ Group Holdings Inc., 300 Lindenwood Drive, Valleybrooke Corporate Center, Malvern, Pennsylvania 19355, Attention: Joseph S. Koscinski.

[Signature pages follow]

Very truly yours,

PQ Group Holdings Inc.

By: _____
Name:
Title:

Accepted as of the date hereof

Morgan Stanley & Co. LLC
Goldman Sachs & Co. LLC

Acting severally on behalf of themselves and the several Underwriters
named in Schedule I hereto.

By: Morgan Stanley & Co. LLC

By: _____
Name:
Title:

By: Goldman Sachs & Co. LLC

By: _____
Name:
Title:

<u>Underwriter</u>	<u>Number of Firm Shares To Be Purchased</u>
Morgan Stanley & Co. LLC	
Goldman Sachs & Co. LLC	
Citigroup Global Markets Inc.	
Credit Suisse Securities (USA) LLC	
J.P. Morgan Securities LLC	
Jefferies LLC	
Deutsche Bank Securities Inc.	
KeyBanc Capital Markets Inc.	
Evercore Group L.L.C.	
Nomura Securities International, Inc.	
Total:	

Time of Sale Prospectus

1. Preliminary Prospectus dated []
2. [free writing prospectuses filed by the Company under Rule 433(d) of the Securities Act]
3. [free writing prospectus containing a description of terms that does not reflect final terms, if the Time of Sale Prospectus does not include a final term sheet]
4. [orally communicated pricing information such as price per share and size of offering if a Rule 134 pricing term sheet is used at the time of sale instead of a pricing term sheet filed by the Company under Rule 433(d) as a free writing prospectus]

Significant Subsidiaries

[•]

III-1

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 _____, 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 Cogeny 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 _____, consisting of _____ shares of Common Stock, par value \$0.01 per share ("Common Stock"), and _____ 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 day of
, 2017.

PQ GROUP HOLDINGS INC.

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

Signature Page to Second Restated Certificate of Incorporation

AMENDED AND RESTATED BYLAWS

OF

PQ GROUP HOLDINGS INC.

SECTION 1 — STOCKHOLDERS

Section 1.1. Annual Meeting.

An annual meeting of the stockholders of PQ Group Holdings Inc., a Delaware corporation (the "Corporation"), for the election of directors to succeed those whose terms expire and for the transaction of such other business as may properly come before the meeting shall be held at the place, if any, within or without the State of Delaware, on the date and at the time that the Board of Directors of the Corporation (the "Board of Directors") shall each year fix. Unless stated otherwise in the notice of the annual meeting of the stockholders of the Corporation, such annual meeting shall be at the principal office of the Corporation.

Section 1.2. Advance Notice of Nominations and Proposals of Business.

(a) Nominations of persons for election to the Board of Directors and proposals for other business to be transacted by the stockholders at an annual meeting of stockholders may be made (i) pursuant to the Corporation's notice with respect to such meeting (or any supplement thereto), (ii) by or at the direction of the Board of Directors or any committee thereof or (iii) by any stockholder of record of the Corporation who (A) was a stockholder of record at the time of the giving of the notice contemplated in Section 1.2(b), (B) is entitled to vote at such meeting and (C) has complied with the notice procedures set forth in this Section 1.2. Subject to Section 1.2(i) and except as otherwise required by law, clause (iii) of this Section 1.2(a) shall be the exclusive means for a stockholder to make nominations or propose other business (other than nominations and proposals properly brought pursuant to applicable provisions of federal law, including the Securities Exchange Act of 1934 (as amended from time to time, the "Exchange Act") and the rules and regulations of the Securities and Exchange Commission thereunder) before an annual meeting of stockholders.

(b) Except as otherwise required by law, for nominations or proposals to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of Section 1.2(a), (i) the stockholder must have given timely notice thereof in writing to the Secretary with the information contemplated by Section 1.2(c) including, where applicable, delivery to the Corporation of timely and completed questionnaires as contemplated by Section 1.2(c), and (ii) the business must be a proper matter for stockholder action under the General Corporation Law of the State of Delaware (the "DGCL"). The notice requirements of this Section 1.2 shall be deemed satisfied by a stockholder with respect to business other than a nomination if the stockholder has notified the Corporation of his, her or its intention to present a proposal at an annual meeting in compliance with applicable rules and regulations promulgated under the Exchange Act and such stockholder's proposal has been included in a proxy statement prepared by the Corporation to solicit proxies for such annual meeting.

(c) To be timely for purposes of Section 1.2(b), a stockholder's notice must be delivered to the Secretary at the principal executive offices of the Corporation on a date (i) not

later than the close of business on the ninetieth (90th) day nor earlier than the close of business on the one hundred twentieth (120^h) day prior to the anniversary date of the prior year's annual meeting or (ii) if there was no annual meeting in the prior year or if the date of the current year's annual meeting is more than thirty (30) days before or after the anniversary date of the prior year's annual meeting, on or before ten (10) days after the day on which the date of the current year's annual meeting is first disclosed in a public announcement. In no event shall any adjournment or postponement of an annual meeting or the announcement thereof commence a new time period for the delivery of such notice. Such notice from a stockholder must state (i) as to each nominee that the stockholder proposes for election or reelection as a director, (A) all information relating to such nominee that would be required to be disclosed in solicitations of proxies for the election of such nominee as a director pursuant to Regulation 14A under the Exchange Act and such nominee's written consent to serve as a director if elected, and (B) a description of all direct and indirect compensation and other material monetary arrangements, agreements or understandings during the past three years, and any other material relationship, if any, between or concerning such stockholder, any Stockholder Associated Person (as defined below) or any of their respective affiliates or associates, on the one hand, and the proposed nominee or any of his or her affiliates or associates, on the other hand; (ii) as to each proposal that the stockholder seeks to bring before the meeting, a brief description of such proposal, the reasons for making the proposal at the meeting, the text of the proposal (including the text of any resolutions proposed for consideration and in the event that it includes a proposal to amend the bylaws of the Corporation, the language of the proposed amendment) and any material interest that the stockholder has in the proposal; and (iii) (A) the name and address of the stockholder giving the notice and the Stockholder Associated Persons, if any, on whose behalf the nomination or proposal is made, (B) the class (and, if applicable, series) and number of shares of stock of the Corporation that are, directly or indirectly, owned beneficially or of record by the stockholder or any Stockholder Associated Person, (C) any option, warrant, convertible security, stock appreciation right or similar instrument, right, agreement, arrangement or understanding with an exercise or conversion privilege or a settlement payment or mechanism at a price related to any class (or, if applicable, series) of shares of stock of the Corporation or with a value derived in whole or in part from the value of any class (or, if applicable, series) of shares of stock of the Corporation, whether or not such instrument, right, agreement, arrangement or understanding shall be subject to settlement in the underlying class or series of stock of the Corporation or otherwise, and any other direct or indirect opportunity to profit or share in any profit derived from any increase or decrease in the value of shares of stock of the Corporation (each, a "Derivative Instrument"), in each case that is directly or indirectly owned beneficially or of record by such stockholder or any Stockholder Associated Person, (D) any proxy, contract, arrangement, understanding or relationship pursuant to which such stockholder or any Stockholder Associated Person has a right to vote any securities of the Corporation, (E) any proportionate interest in shares of the Corporation or Derivative Instruments held, directly or indirectly, by a general or limited partnership in which such stockholder or any Stockholder Associated Person is a general partner or beneficially owns, directly or indirectly, an interest in a general partner, (F) any performance-related fees (other than an asset-based fee) that such stockholder or any Stockholder Associated Person is entitled to based on any increase or decrease in the value of the shares of stock of the Corporation or Derivative Instruments, (G) any other information relating to such stockholder or any Stockholder Associated Person, if any, required to be disclosed in a proxy statement or other filing required to be made in connection

with solicitations of proxies for, as applicable, the proposal and/or for the election of directors in an election contest pursuant to and in accordance with Section 14(a) of the Exchange Act and the rules and regulations of the Securities and Exchange Commission thereunder, (H) a representation that the stockholder is a holder of record of the Corporation entitled to vote at such meeting and intends to appear in person or by proxy at the meeting to propose such business or nomination, (I) a certification as to whether or not the stockholder and all Stockholder Associated Persons have complied with all applicable federal, state and other legal requirements in connection with the stockholder's and each Stockholder Associated Person's acquisition of shares of stock or other securities of the Corporation and the stockholder's and each Stockholder Associated Person's acts or omissions as a stockholder (or beneficial owner of securities) of the Corporation, and (J) whether the stockholder intends to deliver a proxy statement and form of proxy to holders of, in the case of a proposal, at least the percentage of the Corporation's voting shares required under applicable law to carry the proposal or, in the case of a nomination or nominations, a sufficient number of holders of the Corporation's voting shares reasonably believed by such stockholder to be sufficient to elect such nominee or nominees or otherwise to solicit proxies or votes from stockholders in support of such proposal or nomination. For purposes of these bylaws, a "Stockholder Associated Person" of any stockholder means (i) any "affiliate" or "associate" (as those terms are defined in Rule 12b-2 under the Exchange Act) of such stockholder, (ii) any beneficial owner of any stock or other securities of the Corporation owned of record or beneficially by such stockholder, (iii) any person directly or indirectly controlling, controlled by or under common control with any such Stockholder Associated Person referred to in clause (i) or (ii) above, and (iv) any person acting in concert in respect of any matter involving the Corporation or its securities with either such stockholder or any beneficial owner of any stock or other securities of the Corporation owned of record or beneficially by such stockholder. In addition, in order for a nomination to be properly brought before an annual or special meeting by a stockholder pursuant to clause (iii) of Section 1.2(a), any nominee proposed by a stockholder shall complete a questionnaire, in a form provided by the Corporation, and deliver a signed copy of such completed questionnaire to the Corporation within ten (10) days of the date that the Corporation makes available to the stockholder seeking to make such nomination or such nominee the form of such questionnaire. The Corporation may require any proposed nominee to furnish such other information as may be reasonably requested by the Corporation to determine the eligibility of the proposed nominee to serve as an independent director of the Corporation or that could be material to a reasonable stockholder's understanding of the independence, or lack thereof, of the nominee. The information required to be included in a notice pursuant to this Section 1.2(c) shall be provided as of the date of such notice and shall be supplemented by the stockholder not later than ten (10) days after the record date for the determination of stockholders entitled to notice of the meeting to disclose any changes to such information as of the record date. The information required to be included in a notice pursuant to this Section 1.2(c) shall not include any ordinary course business activities of any broker, dealer, commercial bank, trust company or other nominee who is directed to prepare and submit the notice required by this Section 1.2(c) on behalf of a beneficial owner of the shares held of record by such broker, dealer, commercial bank, trust company or other nominee and who is not otherwise affiliated or associated with such beneficial owner.

(d) Subject to the certificate of incorporation of the Corporation (the "Certificate of Incorporation"), Section 1.2(i) and applicable law, only persons nominated in

accordance with procedures stated in this Section 1.2 shall be eligible for election as and to serve as members of the Board of Directors and the only business that shall be conducted at an annual meeting of stockholders is the business that has been brought before the meeting in accordance with the procedures set forth in this Section 1.2. The chairperson of the meeting shall have the power and the duty to determine whether a nomination or any proposal has been made according to the procedures stated in this Section 1.2 and, if any nomination or proposal does not comply with this Section 1.2, unless otherwise required by law, the nomination or proposal shall be disregarded.

(e) For purposes of this Section 1.2, “public announcement” means disclosure in a press release reported by the Dow Jones News Service, Associated Press or a comparable news service or in a document publicly filed or furnished by the Corporation with or to the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the Exchange Act.

(f) Notwithstanding the foregoing provisions of this Section 1.2, a stockholder shall also comply with applicable requirements of the Exchange Act and the rules and regulations thereunder with respect to matters set forth in this Section 1.2. Nothing in this Section 1.2 shall affect any rights, if any, of stockholders to request inclusion of nominations or proposals in the Corporation’s proxy statement pursuant to applicable provisions of federal law, including the Exchange Act.

(g) Notwithstanding the foregoing provisions of this Section 1.2, unless otherwise required by law, if the stockholder (or a qualified representative of the stockholder) does not appear at the annual or special meeting of stockholders of the Corporation to present a nomination or proposed business or does not provide the information required by Section 1.2(c), including any required supplement thereto, such nomination shall be disregarded and such proposed business shall not be transacted, notwithstanding that proxies in respect of such vote may have been received by the Corporation. For purposes of this Section 1.2, to be considered a qualified representative of the stockholder, a person must be a duly authorized officer, manager or partner of such stockholder or must be authorized by a writing executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the meeting of stockholders and such person must produce such writing or electronic transmission, or a reliable reproduction of the writing or electronic transmission, at the meeting of stockholders.

(h) Only such business shall be conducted at a special meeting of stockholders as shall have been brought before the meeting pursuant to the Corporation’s notice of meeting. Nominations of persons for election to the Board of Directors may be made at a special meeting of stockholders at which directors are to be elected pursuant to the Corporation’s notice of meeting (1) by or at the direction of the Board of Directors or any committee thereof or (2) provided that the Board of Directors has determined that directors shall be elected at such meeting, by any stockholder of the Corporation who is a stockholder of record at the time the notice provided for in this Section 1.2 is delivered to the Secretary, who is entitled to vote at the meeting upon such election and who complies with the notice procedures set forth in this Section 1.2. In the event the Corporation calls a special meeting of stockholders for the purpose of electing one or more directors to the Board of Directors, any such stockholder entitled to vote in such election of directors may nominate a person or persons (as the case may be) for election to

such position(s) as specified in the Corporation's notice of meeting, if the stockholder's notice required by paragraph (b) of this Section 1.2 shall be delivered to the Secretary at the principal executive offices of the Corporation not earlier than the close of business on the one hundred twentieth (120th) day prior to such special meeting and not later than the close of business on the later of the ninetieth (90th) day prior to such special meeting or the tenth (10^h) day following the day on which public announcement is first made of the date of the special meeting and of the nominees proposed by the Board of Directors to be elected at such meeting. In no event shall the public announcement of an adjournment or postponement of a special meeting commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above.

(i) All provisions of this Section 1.2 are subject to, and nothing in this Section 1.2 shall in any way limit the exercise, or the method or timing of the exercise of, the rights of any person granted by the Corporation to nominate directors, which rights may be exercised without compliance with the provisions of this Section 1.2.

Section 1.3. Special Meetings: Notice.

Special meetings of the stockholders of the Corporation may be called only to the extent and in the manner set forth in the Certificate of Incorporation. Notice of every special meeting of the stockholders of the Corporation shall state the purpose or purposes of such meeting. Except as otherwise required by law, the business conducted at a special meeting of stockholders of the Corporation shall be limited exclusively to the business set forth in the Corporation's notice of meeting, and the individual or group calling such meeting shall have exclusive authority to determine the business included in such notice.

Section 1.4. Notice of Meetings.

Notice of the place, if any, date and time of all meetings of stockholders of the Corporation, the record date for determining the stockholders entitled to vote at the meeting (if such date is different from the record date for stockholders entitled to notice of the meeting) and the means of remote communications, if any, by which stockholders and proxy holders may be deemed present and vote at such meeting, and, in the case of all special meetings of stockholders, the purpose or purposes of the meeting, shall be given, not less than ten (10) nor more than sixty (60) days before the date on which such meeting is to be held (unless a different time is specified by law or applicable rule or regulation), to each stockholder entitled to notice of the meeting.

The Corporation may postpone or cancel any previously called annual or special meeting of stockholders of the Corporation by making a public announcement (as defined in Section 1.2(e)) of such postponement or cancellation prior to the meeting. When a previously called annual or special meeting is postponed to another time, date or place, if any, notice of the place (if any), date and time of the postponed meeting, the record date for determining the stockholders entitled to vote at the meeting (if such date is different from the record date for stockholders entitled to notice of the meeting) and the means of remote communications, if any, by which stockholders and proxy holders may be deemed present and vote at such postponed meeting, shall be given in conformity with this Section 1.4 unless such meeting is postponed to a date that is not more than sixty (60) days after the date that the initial notice of the meeting was provided in conformity with this Section 1.4.

When a meeting is adjourned to another time or place, notice need not be given of the adjourned meeting if the time and place, if any, thereof and the means of remote communication, if any, by which stockholders and proxy holders may be deemed to be present and vote at such adjourned meeting are announced at the meeting at which the adjournment is taken; provided, however, that if the adjournment is for more than thirty (30) days, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting, or if after the adjournment a new record date for stockholders entitled to vote is fixed for the adjourned meeting the Board of Directors shall fix a new record date for notice of such adjourned meeting in conformity herewith and such notice shall be given to each stockholder of record entitled to vote at such adjourned meeting as of the record date for notice of such adjourned meeting. At any adjourned meeting, any business may be transacted that may have been transacted at the original meeting.

Section 1.5. Quorum.

At any meeting of the stockholders, the holders of shares of stock of the Corporation entitled to cast a majority of the total votes entitled to be cast by the holders of all outstanding shares of capital stock of the Corporation entitled to vote generally in the election of directors (“Voting Stock”), present in person or by proxy, shall constitute a quorum for all purposes, unless or except to the extent that the presence of a larger number is required by applicable law or the Certificate of Incorporation. If a separate vote by one or more classes or series is required, the holders of shares entitled to cast a majority of the total votes entitled to be cast by the holders of the shares of the class or classes or series, present in person or represented by proxy, shall constitute a quorum entitled to take action with respect to that vote on that matter. A quorum, once established, shall not be deemed to cease to exist due to the subsequent withdrawal prior to the closing of the meeting of shares of Voting Stock that would result in less than a quorum remaining present in person or by proxy at such meeting. For the purposes of the immediately preceding sentence, an adjournment of a meeting shall not constitute the closing of such meeting.

If a quorum shall fail to attend any meeting, the chairperson of the meeting may adjourn the meeting to another place, if any, date and time. At any such adjourned meeting at which there is a quorum, any business may be transacted that might have been transacted at the meeting originally called.

Section 1.6. Organization.

The chairperson of the Board of Directors or, in his or her absence, the person whom the Board of Directors designates or, in the absence of that person or the failure of the Board of Directors to designate a person, the President or, in his or her absence, the person chosen by the holders of a majority of the shares of capital stock entitled to vote who are present, in person or by proxy, shall call to order any meeting of the stockholders of the Corporation and act as chairperson of the meeting. In the absence of the Secretary or any Assistant Secretary, the secretary of the meeting shall be the person the chairperson appoints.

Section 1.7. Conduct of Business.

The chairperson of any meeting of stockholders of the Corporation shall determine the order of business and the rules of procedure for the conduct of such meeting, including the manner of voting and the conduct of discussion as he or she determines to be in order. The chairperson shall have the power to adjourn the meeting to another place, if any, date and time. The date and time of the opening and closing of the polls for each matter upon which the stockholders will vote at the meeting shall be announced at the meeting. Except to the extent inconsistent with such rules and regulations as adopted by the Board of Directors, the chairperson of the meeting shall have the right and authority to convene and (for any or no reason) to adjourn the meeting, to prescribe such rules, regulations and procedures and to do all such acts as, in the judgment of such chairperson, are appropriate for the proper conduct of the meeting. Such rules, regulations or procedures, whether adopted by the Board of Directors or prescribed by the chairperson of the meeting, may include, without limitation, the following: (i) the establishment of an agenda or order of business for the meeting; (ii) rules and procedures for maintaining order at the meeting and the safety of those present; (iii) limitations on attendance at or participation in the meeting to stockholders entitled to vote at the meeting, their duly authorized and constituted proxies or such other persons as the chairperson of the meeting shall determine; (iv) restrictions on entry to the meeting after the time fixed for the commencement thereof; and (v) limitations on the time allotted to questions or comments by participants. The chairperson of the meeting of stockholders, in addition to making any other determinations that may be appropriate to the conduct of the meeting, shall, if the facts warrant, determine and declare to the meeting that a nomination or matter of business was not properly brought before the meeting and if such chairperson should so determine, such chairperson shall so declare to the meeting and any such matter or business not properly brought before the meeting shall not be transacted or considered. Unless and to the extent determined by the Board of Directors or the chairperson of the meeting, meetings of stockholders shall not be required to be held in accordance with the rules of parliamentary procedure.

Section 1.8. Proxies; Inspectors.

(a) At any meeting of the stockholders, every stockholder entitled to vote may vote in person or by proxy authorized by an instrument in writing or by a transmission permitted by applicable law, but no such proxy shall be voted or acted upon after three (3) years from its date, unless the proxy provides for a longer period. A proxy shall be irrevocable if it states that it is irrevocable and if, and only as long as, it is coupled with an interest sufficient in law to support an irrevocable power. A stockholder may revoke any proxy that is not irrevocable by attending the meeting and voting in person or by delivering to the Secretary a revocation of the proxy or a new proxy bearing a later date.

(b) Prior to a meeting of the stockholders of the Corporation, the Corporation shall appoint one or more inspectors, who may be employees of the Corporation, to act at a meeting of stockholders of the Corporation and make a written report thereof. The Corporation may designate one or more persons as alternate inspectors to replace any inspector who fails to act. If no inspector or alternate is able to act at a meeting of stockholders, the person presiding at the meeting may, and to the extent required by applicable law, shall, appoint one or more inspectors to act at the meeting. Each inspector, before beginning the discharge of his or her

duties, shall take and sign an oath faithfully to execute the duties of inspector with strict impartiality and according to the best of his or her ability. The inspectors may appoint or retain other persons or entities to assist the inspectors in the performance of the duties of inspectors. The inspectors shall have the duties prescribed by applicable law. Unless otherwise provided by the Board of Directors, the date and time of the opening and the closing of the polls for each matter upon which the stockholders will vote at a meeting shall be announced at the meeting. No ballot, proxies, votes or any revocation thereof or change thereto shall be accepted by the inspectors after the closing of the polls. In determining the validity and counting of proxies and ballots cast at any meeting of stockholders, the inspectors may consider such information as is permitted by applicable law. No person who is a candidate for office at an election may serve as an inspector at such election.

Section 1.9. Voting.

Except as otherwise required by applicable law or any rule or regulation of any applicable stock exchange, the Certificate of Incorporation or these bylaws, all matters other than the election of directors shall be determined by a majority of the votes cast on the matter affirmatively or negatively. All elections of directors shall be determined by a plurality of the votes cast.

Section 1.10. Action without Meetings.

Unless otherwise provided in the Certificate of Incorporation, any action required or permitted to be taken by stockholders for or in connection with any corporate action required or permitted to be taken by stockholders for or in connection with any corporate action may be taken without a meeting, without prior notice and without a vote, if a consent or consents in writing, setting forth the action so taken, shall be signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted. Any such written consent in lieu of meeting must be obtained, delivered and filed in accordance with the requirements of Section 228 of the DGCL.

If action is taken by consent of stockholders and in accordance with the foregoing, there shall be filed with the records of the meetings of stockholders the writing or writings comprising such consent.

If action is taken by less than unanimous consent of stockholders, prompt notice of the taking of such action without a meeting shall be given to those who have not consented in writing and a certificate signed and attested to by the secretary that such notice was given shall be filed with the records of the meetings of stockholders.

In the event that the action which is consented to is such as would have required the filing of a certificate under any provision of the DGCL if such action had been voted upon by the stockholders at a meeting thereof, the certificate filed under such provision shall state, in lieu of any statement required by such provision concerning a vote of stockholders, that written consent has been given under Section 228 of the DGCL and that written notice has been given as provided in such Section 228.

Section 1.11. Stock List.

A complete list of stockholders of the Corporation entitled to vote at any meeting of stockholders of the Corporation, arranged in alphabetical order for each class of stock and showing the address of each such stockholder and the number of shares registered in the name of such stockholder, shall be open to the examination of any such stockholder, for any purpose germane to a meeting of the stockholders of the Corporation, for a period of at least ten (10) days before the meeting (i) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of the meeting or (ii) during ordinary business hours at the principal place of business of the Corporation; provided, however, if the record date for determining the stockholders entitled to vote is less than ten (10) days before the meeting date, the list shall reflect the stockholders entitled to vote as of the tenth (10th) day before such meeting date. The stock list shall also be open to the examination of any such stockholder during the entire meeting in the manner required by the DGCL. The Corporation may look to this list as the sole evidence of the identity of the stockholders entitled to vote at a meeting and the number of shares held by each stockholder.

SECTION 2 — BOARD OF DIRECTORS

Section 2.1. General Powers and Qualifications of Directors.

The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors. In addition to the powers and authorities these bylaws expressly confer upon them, the Board of Directors may exercise all such powers of the Corporation and do all such lawful acts and things as are not by the DGCL, the Certificate of Incorporation or these bylaws required to be exercised or done by the stockholders. Directors need not be stockholders of the Corporation to be qualified for election or service as a director of the Corporation.

Section 2.2. Removal; Resignation.

The directors of the Corporation may be removed in accordance with the Certificate of Incorporation and the DGCL. Any director may resign at any time upon notice given in writing, including by electronic transmission, to the Corporation.

Section 2.3. Regular Meetings.

Regular meetings of the Board of Directors shall be held at the place (if any), on the date and at the time as shall have been established by the Board of Directors and publicized among all directors. A notice of a regular meeting, the date of which has been so publicized, shall not be required.

Section 2.4. Special Meetings.

Special meetings of the Board of Directors may be called by (i) the chairperson or vice-chairperson of the Board of Directors, (ii) the President or (iii) two or more directors then in office, and shall be held at the place, if any, on the date and at the time as he, she or they shall fix. Notice of the place, if any, date and time of each special meeting shall be given to each director either (a) by mailing written notice thereof not less than five days before the meeting, or

(b) by telephone, facsimile or other means of electronic transmission providing notice thereof not less than twenty-four (24) hours before the meeting. Any and all business may be transacted at a special meeting of the Board of Directors.

Section 2.5. Quorum.

At any meeting of the Board of Directors, a majority of the total number of directors then in office shall constitute a quorum for all purposes. If a quorum shall fail to attend any meeting, a majority of those present may adjourn the meeting to another place, if any, date or time, without further notice or waiver thereof.

Section 2.6. Participation in Meetings by Conference Telephone or Other Communications Equipment

Members of the Board of Directors, or of any committee thereof, may participate in a meeting of the Board of Directors or committee thereof by means of conference telephone or other communications equipment by means of which all directors participating in the meeting can hear each other director, and such participation shall constitute presence in person at the meeting.

Section 2.7. Conduct of Business.

At any meeting of the Board of Directors, business shall be transacted in the order and manner that the Board of Directors may from time to time determine, and all matters shall be determined by the vote of a majority of the directors present, provided a quorum is present at the time such matter is acted upon, except as otherwise provided in the Certificate of Incorporation or these bylaws or required by applicable law. The Board of Directors or any committee thereof may take action without a meeting if all members thereof consent thereto in writing or by electronic transmission, and the writing or writings, or electronic transmission or electronic transmissions, are filed with the minutes of proceedings of the Board of Directors or any committee thereof. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

Section 2.8. Compensation of Directors.

The Board of Directors shall be authorized to fix the compensation of directors. The directors of the Corporation shall be paid their expenses, if any, of attendance at each meeting of the Board of Directors and may be reimbursed a fixed sum for attendance at each meeting of the Board of Directors, paid an annual retainer or paid other compensation, including equity compensation, as the Board of Directors determines. No such payment shall preclude any director from serving the Corporation in any other capacity and receiving compensation therefor. Members of committees shall have their expenses, if any, of attendance of each meeting of such committee reimbursed and may be paid compensation for attending committee meetings or being a member of a committee.

SECTION 3 — COMMITTEES

The Board of Directors may designate committees of the Board of Directors, with such lawfully delegable powers and duties as it thereby confers, to serve at the pleasure of the Board of Directors and shall, for those committees, appoint a director or directors to serve as the member or members, designating, if it desires, other directors as alternate members who may replace any absent or disqualified member at any meeting of such committee. In the absence or disqualification of any member of any committee and any alternate member in his or her place, the member or members of the committee present at the meeting and not disqualified from voting, whether or not he or she or they constitute a quorum, may by unanimous vote appoint another member of the Board of Directors to act at the meeting in the place of the absent or disqualified member. All provisions of this Section 3 are subject to, and nothing in this Section 3 shall in any way limit the exercise, or method or timing of the exercise, of the rights of any person granted by the Corporation with respect to the existence, duties, composition or conduct of any committee of the Board of Directors.

SECTION 4 — OFFICERS

Section 4.1. Generally.

The officers of the Corporation shall consist of a Chief Executive Officer, President, one or more Executive Vice Presidents, one or more Vice Presidents, a Secretary, one or more Assistant Secretaries, a Chief Financial Officer, a Treasurer, one or more Assistant Treasurers, and such other officers as the Board of Directors may from time to time determine, each of whom shall be elected by the Board of Directors and have such authority, functions or duties set forth in these bylaws or as determined by the Board of Directors. Each officer shall hold office for such term as may be prescribed by the Board of Directors and until such person's successor shall have been duly elected and qualified or until such person's earlier death, disqualification, resignation or removal. Any number of offices may be held by the same person. The compensation of officers appointed by the Board of Directors shall be determined from time to time by the Board of Directors or a committee thereof or by the officers as may be designated by resolution of the Board of Directors.

Section 4.2. President.

Unless otherwise determined by the Board of Directors, the President shall be the Chief Executive Officer of the Corporation. Subject to the provisions of these bylaws and to the direction of the Board of Directors, he or she shall have the responsibility for the general management and control of the business and affairs of the Corporation and shall perform all duties and have all powers that are commonly incident to the office of chief executive or which are delegated to him or her by the Board of Directors. He or she shall have the power to sign all stock certificates, contracts and other instruments of the Corporation that are authorized and shall have general supervision and direction of all of the other officers, employees and agents of the Corporation.

Section 4.3. Executive Vice President and Vice President.

Each Executive Vice President and Vice President shall have the powers and duties delegated to him or her by the Board of Directors or the President. One Executive Vice President may be designated by the Board of Directors to perform the duties and exercise the powers of the President in the event of the President's absence or disability.

Section 4.4. Secretary and Assistant Secretaries.

The Secretary shall issue all authorized notices for, and shall keep minutes of, all meetings of the stockholders and the Board of Directors. He or she shall have charge of the corporate books and shall perform other duties as the Board of Directors may from time to time prescribe.

Any Assistant Secretary shall perform such duties and possess such powers as the Board of Directors, the President or the Secretary may from time to time prescribe. In the event of the absence, inability or refusal to act of the Secretary, the Assistant Secretary (or if there shall be more than one, the Assistant Secretaries in the order determined by the Board of Directors), shall perform the duties and exercise the powers of the Secretary.

Section 4.5. Chief Financial Officer, Treasurer and Assistant Treasurers.

The Chief Financial Officer shall keep or cause to be kept the books of account of the Corporation in a thorough and proper manner and shall render statements of the financial affairs of the Corporation in such form and as often as required by the Board of Directors or the President. The Chief Financial Officer, subject to the order of the Board of Directors, shall have the custody of all funds and securities of the Corporation. The Chief Financial Officer shall perform other duties commonly incident to his office and shall also perform such other duties and have such other powers as the Board of Directors or the President shall designate from time to time. The President may direct the Treasurer or any Assistant Treasurer to assume and perform the duties of the Chief Financial Officer in the absence or disability of the Chief Financial Officer, and each Treasurer and Assistant Treasurer shall perform other duties commonly incident to his office and shall also perform such other duties and have such other powers as the Board of Directors, the President or the Chief Financial Officer shall designate from time to time.

Section 4.6. Delegation of Authority.

The Board of Directors may from time to time delegate the powers or duties of any officer to any other officer or agent, notwithstanding any provision hereof.

Section 4.7. Removal.

The Board of Directors may remove any officer of the Corporation at any time, with or without cause, without prejudice to the rights, if any, of such officer under any contract to which the Corporation or any of its subsidiaries is a party. Any officer may resign at any time upon written notice to the Corporation, without prejudice to the rights, if any, of the Corporation or any of its subsidiaries under any contract to which such officer is a party. If any vacancy occurs in any office of the Corporation, the Board of Directors may elect a successor to fill such vacancy for the remainder of the unexpired term and until a successor shall have been fully chosen and qualified.

Section 4.8. Action with Respect to Securities of Other Companies

Unless otherwise directed by the Board of Directors, the President or any officer of the Corporation authorized by the President shall have power to vote and otherwise act on behalf of the Corporation, in person or by proxy, at any meeting of stockholders or equityholders of, or with respect to any action of, stockholders or equityholders of any other entity in which the Corporation may hold securities and otherwise to exercise any and all rights and powers which the Corporation may possess by reason of its ownership of securities in such other entity.

SECTION 5 — STOCK

Section 5.1. Certificates of Stock.

Shares of the capital stock of the Corporation may be certificated or uncertificated, as provided in the DGCL. Stock certificates shall be signed by, or in the name of the Corporation by, (i) the chairperson of the Board of Directors (if any) or the vice-chairperson of the Board of Directors (if any), the President or a Vice President, and (ii) the Secretary, an Assistant Secretary, the Chief Financial Officer, the Treasurer or an Assistant Treasurer, certifying the number of shares owned by such stockholder. Any signatures on a certificate may be by facsimile.

Section 5.2. Transfers of Stock.

Transfers of stock shall be made only upon the transfer books of the Corporation kept at an office of the Corporation (within or without the State of Delaware) or by transfer agents designated to transfer shares of the stock of the Corporation.

Section 5.3. Lost, Stolen or Destroyed Certificates

In the event of the loss, theft or destruction of any certificate of stock, another may be issued in its place pursuant to regulations as the Board of Directors may establish concerning proof of the loss, theft or destruction and concerning the giving of a satisfactory bond or indemnity, if deemed appropriate.

Section 5.4. Regulations.

The issue, transfer, conversion and registration of certificates of stock of the Corporation shall be governed by other regulations as the Board of Directors may establish.

Section 5.5. Record Date.

In order that the Corporation may determine the stockholders entitled to notice of any meeting of stockholders or any adjournment thereof, the Board of Directors may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board of Directors, and which record date shall, unless otherwise required by law, not be more than sixty (60) nor less than ten (10) days before the date of such meeting. If the Board of Directors so fixes a date, such date shall also be the record date for determining the stockholders entitled to vote at such meeting unless the Board of Directors determines, at the

time it fixes such record date, that a later date on or before the date of the meeting shall be the date for making such determination. If no record date is fixed by the Board of Directors, the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held. A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; provided, however, that the Board of Directors may fix a new record date for determination of stockholders entitled to vote at the adjourned meeting, and in such case shall also fix as the record date for stockholders entitled to notice of such adjourned meeting the same or an earlier date as that fixed for determination of stockholders entitled to vote in accordance herewith at the adjourned meeting.

(b) In order that the Corporation may determine the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights, or entitled to exercise any rights in respect of any change, conversion or exchange of stock or for the purpose of any other lawful action, the Board of Directors may fix a record date, which shall not be more than sixty (60) days prior to such other action. If no such record date is fixed, the record date for determining stockholders for any such purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto.

SECTION 6 — INDEMNIFICATION AND ADVANCEMENT OF EXPENSES

Section 6.1. Indemnification.

The Corporation shall, to the fullest extent permitted by applicable law as it presently exists or may hereafter be amended, indemnify, defend and hold harmless any person (an "Indemnitee") who was or is made, or is threatened to be made, a party or is otherwise involved in any action, suit or proceeding, whether civil, criminal, administrative or investigative (a "Proceeding"), by reason of the fact that he or she, or a person for whom he or she is the legal representative, is or was a director of the Corporation or an officer of the Corporation elected by the Board of Directors or, while a director of the Corporation or an officer of the Corporation elected by the Board of Directors, is or was serving at the request of the Corporation as a director, officer, employee, member, trustee or agent of another corporation or of a partnership, joint venture, trust, nonprofit entity or other enterprise (including, but not limited to, service with respect to employee benefit plans) (any such entity, an "Other Entity"), against all liability and loss suffered (including, but not limited to, expenses (including, but not limited to, attorneys' fees and expenses), judgments, fines and amounts paid in settlement actually and reasonably incurred by such Indemnitee in connection with such Proceeding). Notwithstanding the preceding sentence, the Corporation shall be required to indemnify an Indemnitee in connection with a Proceeding (or part thereof) commenced by such Indemnitee only if the commencement of such Proceeding (or part thereof) by the Indemnitee was authorized by the Board of Directors or the Proceeding (or part thereof) relates to the enforcement of the Corporation's obligations under this Section 6.1.

Section 6.2. Advancement of Expenses.

The Corporation shall to the fullest extent not prohibited by applicable law pay, on an as-incurred basis, all expenses (including, but not limited to, attorneys' fees and expenses) actually and reasonably incurred by an Indemnitee in defending any Proceeding, which may be indemnifiable pursuant to this Section 6, in advance of its final disposition. Such advancement shall be unconditional, unsecured and interest free and shall be made without regard to Indemnitee's ability to repay any expenses advanced; provided, however, that, to the extent required by law, such payment of expenses in advance of the final disposition of the Proceeding shall be made only upon receipt of an unsecured undertaking by the Indemnitee to repay all amounts advanced if it should be ultimately determined that the Indemnitee is not entitled to be indemnified by the Corporation under this Section 6 or otherwise.

Section 6.3. Claims.

If a claim for indemnification (following the final disposition of such Proceeding) or advancement of expenses under this Section 6 is not paid in full within sixty (60) days after a written claim therefor by the Indemnitee has been received by the Corporation, the Indemnitee may file suit to recover the unpaid amount of such claim and, if successful in whole or in part, shall be entitled to be paid the expense of prosecuting such claim to the fullest extent permitted by law. In any such action the Corporation shall have the burden of proving that the Indemnitee is not entitled to the requested indemnification or advancement of expenses under applicable law.

Section 6.4. Insurance.

The Corporation shall have the power to purchase and maintain insurance on behalf of any person who is or was a director, officer, trustee, employee, member or agent of the Corporation, or was serving at the request of the Corporation as a director, officer, trustee, employee, member or agent of an Other Entity, against any liability asserted against the person and incurred by the person in any such capacity, or arising out of his or her status as such, whether or not the Corporation would have the power or the obligation to indemnify such person against such liability under the provisions of this Section 6 or the DGCL.

Section 6.5. Non-Exclusivity of Rights; Other Indemnification.

The rights conferred on any Indemnitee by this Section 6 are not exclusive of, and shall not be read to limit, restrict or modify in any respect, any other rights (or any limitations on any other rights) to which such Indemnitee may have or hereafter acquire under any bylaw, agreement, vote of directors or stockholders or otherwise, and shall inure to the benefit of the heirs and legal representatives of such Indemnitee. This Section 6 shall not limit the right of the Corporation, to the extent and in the manner permitted by law, to indemnify and to advance expenses to Indemnitees or persons other than Indemnitees when and as authorized by appropriate corporate action, including by separate agreement with the Corporation.

Section 6.6. Amounts Received from an Other Entity.

Subject to the terms of any written agreement between the Indemnitee and the Corporation, the Corporation's obligation, if any, to indemnify or to advance expenses to any Indemnitee who was or is serving at the Corporation's request as a director, officer, employee or agent of an Other Entity shall be reduced by any amount such Indemnitee may collect as indemnification or advancement of expenses from such Other Entity.

Section 6.7. Amendment or Repeal.

Any right to indemnification or to advancement of expenses of any Indemnitee arising hereunder shall not be eliminated or impaired by an amendment to or repeal of this Section 6 after the occurrence of the act or omission that is the subject of the civil, criminal, administrative or investigative action, suit, proceeding or other matter for which indemnification or advancement of expenses is sought.

Section 6.8. Reliance.

Indemnitees who after the date of the adoption of this Section 6 become or remain an Indemnitee described in Section 6.1 will be conclusively presumed to have relied on the rights to indemnity, advancement of expenses and other rights contained in this Section 6 in entering into or continuing the service. The rights to indemnification and to the advancement of expenses conferred in this Section 6 will apply to claims made against any Indemnitee described in Section 6.1 arising out of acts or omissions that occurred or occur either before or after the adoption of this Section 6 in respect of service as a director or officer of the corporation or other service described in Section 6.1.

Section 6.9. Successful Defense.

In the event that any proceeding to which an Indemnitee is a party is resolved in any manner other than by adverse judgment against the Indemnitee (including, without limitation, settlement of such proceeding with or without payment of money or other consideration) it shall be presumed that the Indemnitee has been successful on the merits or otherwise in such proceeding for purposes of Section 145(c) of the DGCL. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence.

Section 6.10. Merger or Consolidation.

For purposes of this Section 6, references to the "Corporation" shall include, in addition to any resulting corporation in any merger, consolidation or similar transaction involving the Corporation, any constituent corporation (including any constituent of a constituent) absorbed in a consolidation or merger which, if its separate existence had continued, would have had power and authority to indemnify its directors, officers and employees or agents, so that any person who is or was a director, officer, employee or agent of such constituent corporation, or is or was serving at the request of such constituent corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, shall stand in the same position under this Section 6 with respect to the resulting or surviving corporation as he or she would have with respect to such constituent corporation if its separate existence had continued.

SECTION 7 — NOTICES

Section 7.1. Notices.

Except as otherwise provided herein or permitted by applicable law, notices to directors and stockholders shall be in writing and delivered personally or mailed to the directors or stockholders at their addresses appearing on the books of the Corporation. If mailed, notice to a stockholder of the Corporation shall be deemed given when deposited in the mail, postage prepaid, directed to a stockholder at such stockholder's address as it appears on the records of the Corporation. Without limiting the manner by which notice otherwise may be given effectively to stockholders, any notice to stockholders of the Corporation may be given by electronic transmission in the manner provided in Section 232 of the DGCL.

Section 7.2. Waivers.

A written waiver of any notice, signed by a stockholder or director, or a waiver by electronic transmission by such person or entity, whether given before or after the time of the event for which notice is to be given, shall be deemed equivalent to the notice required to be given to such person or entity. Neither the business nor the purpose of any meeting need be specified in the waiver. Attendance at any meeting shall constitute waiver of notice except attendance for the sole purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

SECTION 8 — MISCELLANEOUS

Section 8.1. Corporate Seal.

The Board of Directors may provide a suitable seal, containing the name of the Corporation, which seal shall be in the charge of the Secretary. If and when so directed by the Board of Directors, duplicates of the seal may be kept and used by the Treasurer or by an Assistant Secretary, Assistant Treasurer or the Chief Financial Officer.

Section 8.2. Reliance upon Books, Reports, and Records.

Each director and each member of any committee designated by the Board of Directors shall, in the performance of his or her duties, be fully protected in relying in good faith upon the books and records of the Corporation and upon such information, opinions, reports or statements presented to the Corporation by any of its officers, agents or employees, or committees of the Board of Directors so designated, or by any other person or entity as to matters which such director or committee member reasonably believes are within such other person's or entity's professional or expert competence and that has been selected with reasonable care by or on behalf of the Corporation.

Section 8.3. Fiscal Year.

The fiscal year of the Corporation shall be as fixed by the Board of Directors.

Section 8.4. Time Periods.

In applying any provision of these bylaws that requires that an act be done or not be done a specified number of days before an event or that an act be done during a specified number of days before an event, calendar days shall be used, the day of the doing of the act shall be excluded, and the day of the event shall be included.

SECTION 9 — AMENDMENTS

These bylaws may be altered, amended or repealed in accordance with the Certificate of Incorporation and the DGCL.

SECTION 10 — SEVERABILITY

If any provision or provisions of these bylaws 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 these bylaws (including, without limitation, each portion of any paragraph of these bylaws 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 these bylaws (including, without limitation, each such portion of any paragraph of these bylaws 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.

PQ GROUP HOLDINGS INC.

AMENDED & RESTATED STOCKHOLDERS AGREEMENT

Dated as of [●], 2017

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Exhibit A – Form of Joinder Agreement

AMENDED & RESTATED STOCKHOLDERS AGREEMENT, dated as of [●], 2017 (this "Agreement"), among (i) PQ Group Holdings Inc., a Delaware corporation (the "Company"), (ii) CCMP Capital Investors III, L.P., a Delaware limited partnership, CCMP Capital Investors III (Employee), L.P., a Delaware limited partnership, Quartz Co-Invest L.P., a Delaware limited partnership, CCMP Capital Investors III (AV-7), L.P., a Delaware limited partnership, CCMP Capital Investors III (AV-8), L.P., a Delaware limited partnership, CCMP Capital Investors III (AV-9), L.P., a Delaware limited partnership, and CCMP Capital Investors III (AV-10), L.P., a Delaware limited partnership (collectively, "CCMP"), and, together with their respective Permitted Transferees (as defined herein), the "CCMP Investors"), (iii) INEOS Investments Partnership, a general partnership organized under the laws of England and Wales (the "INEOS Investor" and, together with CCMP, each an "Entity Investor" and together, the "Entity Investors") and (iv) each other Stockholder that is a party to this Agreement on the date hereof or becomes a party to this Agreement after the date and pursuant to the terms hereof. Certain capitalized terms used herein are defined in Article II.

WITNESSETH:

WHEREAS, on May 4, 2016, the Company, the CCMP Investors, the INEOS Investor and the other Stockholders party thereto entered into an Amended and Restated Stockholders Agreement (the "Existing Agreement");

WHEREAS, in connection with the Company's initial public offering of its shares of Common Stock (the "IPO"), the parties hereto desire to amend and restate the Existing Agreement in order to set forth their agreement with respect to registration rights and certain other matters; and

WHEREAS, in accordance with Section 7.8 of the Existing Agreement, this Agreement, which constitutes an amendment and restatement of the Existing Agreement, has been approved by Stockholders holding in excess of 75% of the outstanding Voting Securities of the Stockholders party to the Existing Agreement immediately prior to the consummation of the IPO, including each Entity Investor who was party to the Existing Agreement, and shall be effective immediately upon the consummation of the IPO.

NOW, THEREFORE, in consideration of the mutual agreements contained herein, the parties hereto hereby agree as follows:

ARTICLE I
REGISTRATION RIGHTS

1.1. Demand Registration.

(a) At any time, the CCMP Investors may request in writing (which request shall specify the Registrable Securities intended to be disposed of by the CCMP Investors and the intended method of distribution thereof) that the Company effect the registration or listing of all or a portion of the Registrable Securities held by the CCMP Investors (a "Registration Request"). Promptly after its receipt of any Registration Request (but in no event more than 2 Business Days thereafter), the Company will give written notice of such request to all other Holders, and will use its reasonable best efforts to register, in accordance with the provisions of this Agreement, all Registrable Securities that have been requested to be registered in the

Registration Request or by any other Holders by written notice to the Company given within 3 Business Days after the date the Company has given such Holders notice of the Registration Request, not to exceed such other Holder's pro rata share (determined based upon the number of Registrable Securities requested to be registered by the CCMP Investors in such Registration Request as compared to the aggregate number of Registrable Securities held by the CCMP Investors at the time of such Registration Request) of all Registrable Securities to be registered pursuant to such Registration Request, unless otherwise agreed to by the CCMP Investors. The Company will pay all Registration Expenses incurred in connection with any registration pursuant to this Section 1.1. Any registration requested by the CCMP Investors pursuant to this Section 1.1 is referred to in this Agreement as a "Demand Registration." In connection with a Demand Registration, the CCMP Investors shall have the right to select the underwriters to administer the offering, subject to the reasonable approval of the Company. The CCMP Investors shall be entitled to initiate an unlimited number of Demand Registrations.

(b) The Company will use its reasonable best efforts to qualify for registration on Form S-3 or any comparable or successor form or forms or any similar short-form Registration Statement ("Short-Form Registrations"). If requested by the CCMP Investors in a Demand Registration and available to the Company, the Company shall promptly file with the SEC a Short-Form Registration providing for the registration of, and the sale on a continuous or delayed basis of, the Registrable Securities pursuant to Rule 415 under the Securities Act (a "Shelf Registration Statement"). In no event shall the Company be obligated to effect any shelf registration other than pursuant to a Short-Form Registration. The Company will pay all Registration Expenses incurred in connection with any Short-Form Registration. If any Demand Registration is proposed to be a Short-Form Registration and an underwritten offering, and if the managing underwriter shall advise the Company that, in its opinion, it is of material importance to the success of such proposed offering to file a Registration Statement on Form S-1 (or any successor or similar Registration Statement) or to include in such Registration Statement information not required to be included in a Short-Form Registration, then the Company will file a Registration Statement on Form S-1 or supplement the Short-Form Registration as reasonably requested by such managing underwriter.

(c) If the filing, initial effectiveness or continued use of a Registration Statement, including a Shelf Registration Statement, with respect to a Demand Registration would require the Company to make a public disclosure of material non-public information, which disclosure in the good faith judgment of the Board (after consultation with external legal counsel) (i) would be required to be made in any Registration Statement so that such Registration Statement would not be materially misleading, (ii) would not be required to be made at such time but for the filing, effectiveness or continued use of such Registration Statement and (iii) would reasonably be expected to be materially adverse to the Company or its business or on the Company's ability to effect a material proposed acquisition, disposition, financing, reorganization, recapitalization or similar transaction, then the Company may, upon giving prompt written notice of such action to the Holders participating in such registration, delay the filing or initial effectiveness of, or suspend use of, such Registration Statement; provided, that the Company shall not be permitted to do so (x) more than four times during any 12-month period or (y) for periods exceeding, in the aggregate, 90 days during any 12-month period. In the event the Company exercises its rights under the preceding sentence, such Holders agree to suspend, promptly upon their receipt of the notice referred to above, their use of any prospectus relating to such registration in connection with any sale or offer to sell Registrable Securities. If

the Company so postpones the filing of a prospectus or the effectiveness of a Registration Statement, the CCMP Investors shall be entitled to withdraw their Registration Request. The Company will pay all Registration Expenses incurred in connection with any such aborted registration or prospectus.

(d) The Company shall not be obligated to take any action to effect or complete any Demand Registration if a Demand Registration (other than a Shelf Registration Statement) was declared effective within the preceding 180 days, unless otherwise consented to by the Company.

1.2. Shelf Takedown.

(a) At any time the Company has an effective Shelf Registration Statement with respect to the CCMP Investors' Registrable Securities, by notice to the Company specifying the intended method or methods of disposition thereof, the CCMP Investors may make a written request (a "Shelf Takedown Request") to the Company to effect an Underwritten Shelf Takedown of all or a portion of the CCMP Investors' Registrable Securities that may be registered under such Shelf Registration Statement, and as soon as practicable the Company shall amend or supplement the Shelf Registration Statement as necessary for such purpose. The Company will pay all Registration Expenses incurred in connection with any Shelf Takedown Request pursuant to this Section 1.2(a).

(b) Promptly upon receipt of a Shelf Takedown Request (but in no event more than 2 calendar days thereafter or such shorter period as may be reasonably requested in connection with an underwritten "block trade") for any Underwritten Shelf Takedown, the Company shall deliver a notice (a "Shelf Takedown Notice") to each other Holder with Registrable Securities covered by the applicable Shelf Registration Statement (each, a "Potential Takedown Participant"). The Shelf Takedown Notice shall offer each such Potential Takedown Participant the opportunity to include in any Underwritten Shelf Takedown such number of Registrable Securities as each such Potential Takedown Participant may request in writing, not to exceed such Holder's pro rata share (determined based upon the number of Registrable Securities proposed to be sold by the CCMP Investors in such proposed Underwritten Shelf Takedown as compared to the aggregate number of Registrable Securities held by the CCMP Investors immediately prior to such Underwritten Shelf Takedown) of all Registrable Securities to be included in such Underwritten Shelf Takedown, unless otherwise agreed to by the CCMP Investors. The Company shall include in the Underwritten Shelf Takedown all such Registrable Securities with respect to which the Company has received written requests for inclusion therein within 2 calendar days (or such shorter period as may be reasonably requested in connection with an underwritten "block trade") after the date that the Shelf Takedown Notice has been delivered. Notwithstanding the delivery of any Shelf Takedown Notice, all determinations as to whether to complete any Underwritten Shelf Takedown and as to the timing, manner, price and other terms of any Underwritten Shelf Takedown contemplated by this Section 1.2 shall be determined by the CCMP Investors.

(c) The Company shall not be obligated to take any action to effect any Underwritten Shelf Takedown if a Demand Registration (other than a Shelf Registration) was declared effective or an Underwritten Shelf Takedown was consummated within the preceding 30 days, unless otherwise consented to by the Company.

1.3. Piggyback Registration. Whenever the Company proposes to register or list any of its securities (other than (i) a Demand Registration under Section 1.1, (ii) an Underwritten Shelf Takedown under Section 1.2 or (iii) a Special Registration), and the registration form to be filed may be used for the registration, listing or qualification for distribution of Registrable Securities, the Company will give prompt written notice (the "Piggyback Notice") to all Holders of its intention to effect such a registration or listing at least 10 Business Days before the anticipated registration or listing date and will include in such registration or listing all Registrable Securities held by the Holders with respect to which the Company has received written requests for inclusion therein within 10 Business Days after the date of such Piggyback Notice (a "Piggyback Registration"). The Company shall have the right to terminate or withdraw any registration or listing initiated by it under this Section 1.3 (and not pursuant to Section 1.1 or Section 1.2) prior to the effectiveness of such registration or listing whether or not any Holder has elected to include any Registrable Securities in such registration or listing.

1.4. Priority of Securities.

(a) Notwithstanding anything to the contrary in this Agreement, if the managing underwriters of a registered offering of Registrable Securities deliver a written opinion to the Company that the number of securities requested to be included in any such registered offering of Registrable Securities pursuant to this Article I exceeds the number that can be sold without materially adversely affecting the marketability of such offering (including a material adverse effect on the per security offering price) (a "Cutback Event"), the Company will include in such registration or prospectus only such number of securities that in the reasonable opinion of such underwriters can be sold without causing a Cutback Event, which securities will be so included in the following order of priority:

(i) for Demand Registrations pursuant to Section 1.1, first, Registrable Securities of the Holders who have requested registration of their Registrable Securities pursuant to Section 1.1, *pro rata* on the basis of the aggregate number of such Registrable Securities proposed to be registered by such Holders, and second, any Registrable Securities proposed to be registered by the Company;

(ii) for Underwritten Shelf Takedowns pursuant to Section 1.2, first, Registrable Securities of the Holders who have requested to participate in such Underwritten Shelf Takedown pursuant to Section 1.2, *pro rata* on the basis of the aggregate number of such Registrable Securities proposed to be sold by such Holders, and second, any Registrable Securities proposed to be sold by the Company; and

(iii) for Piggyback Registrations pursuant to Section 1.3, first, Registrable Securities proposed to be registered by the Company, and second, Registrable Securities of the Holders who have requested registration of their Registrable Securities pursuant to Section 1.3, *pro rata* on the basis of the aggregate number of such Registrable Securities proposed to be registered by such Holders.

1.5. Registration Procedures.

(a) In the event that Holders request that any of their Registrable Securities be registered pursuant to this Article I, the Company will use its reasonable best efforts to effect the registration and sale of such Registrable Securities in accordance with the intended method of disposition thereof and as soon as possible:

(i) prepare and file with the Commission a Registration Statement with respect to such Registrable Securities and use its reasonable best efforts to cause such Registration Statement to become effective as soon as practicable thereafter; and before filing a Registration Statement or prospectus or any amendments or supplements thereto, furnish to Stockholders' Counsel and the underwriter or underwriters, if any, copies of all such documents proposed to be filed, including documents incorporated by reference in the prospectus and the exhibits thereto, and Stockholders' Counsel (and the underwriter(s), if any) shall have the opportunity to review and comment thereon, and the Company will make such changes and additions thereto as reasonably requested by such Stockholders (and the underwriter(s), if any) prior to filing any Registration Statement or amendment thereto or any prospectus or any supplement thereto;

(ii) prepare and file with the Commission such amendments and supplements to such Registration Statement and the prospectus used in connection therewith as may be required to keep such Registration Statement effective for a period of not less than 180 days, or such shorter period as is necessary to complete the distribution of the securities covered by such Registration Statement and comply with the provisions of the Securities Act with respect to the disposition of all securities covered by such Registration Statement during such period in accordance with the intended methods of disposition by the seller or sellers of such Registrable Securities set forth in such Registration Statement;

(iii) use its reasonable best efforts to register or qualify such Registrable Securities under such other securities or blue sky laws of such jurisdictions as any seller of such Registrable Securities and any underwriter(s) reasonably requests and do any and all other acts and things that may be reasonably necessary or advisable to enable any such seller and any underwriter(s) to consummate the disposition in such jurisdictions of the Registrable Securities; provided that the Company will not be required to (A) qualify generally to do business in any jurisdiction where it would not otherwise be required to qualify but for this subsection, (B) subject itself to taxation in any such jurisdiction or (C) consent to general service of process in any such jurisdiction;

(iv) notify each seller of such Registrable Securities and Stockholders' Counsel and any underwriter(s), at any time when a prospectus relating thereto is required to be delivered under the Securities Act, of the occurrence of any event as a result of which the prospectus included in such Registration Statement contains an untrue statement of a material fact or omits any material fact necessary to make the statements therein not misleading, and, at the request of such sellers or any underwriter(s), the Company shall prepare a supplement or amendment to such prospectus so that, as thereafter delivered to the purchasers of such Registrable Securities, such prospectus shall not contain an untrue statement of a material fact or omit to state any material fact necessary to make the statements therein not misleading;

(v) to the extent the Company is eligible under the relevant provisions of Rule 430B under the Securities Act, if the Company files any Shelf Registration Statement, the Company shall include in such Shelf Registration Statement such disclosures as may be required by Rule 430B under the Securities Act (referring to unnamed selling security holders in

a generic manner by identifying the initial offering of the securities to the Holders) in order to ensure that Holders may be added to such Shelf Registration Statement at a later time through the filing of a prospectus supplement rather than a post-effective amendment;

(vi) in the case of an underwritten offering, (A) enter into such agreements (including underwriting agreements in customary form) as are customary in an underwritten offering and all of the representations and warranties by, and the other agreements on the part of, the Company in the underwriting agreement and other agreements to and for the benefit of such underwriters, shall also be made for the benefit of each seller of Registrable Securities for the limited purpose of its participation in such offering, (B) take all such other actions as such sellers or the underwriter(s) reasonably request in order to expedite or facilitate the disposition of such Registrable Securities, (C) use its reasonable best efforts to cause its counsel to issue opinions of counsel in form, substance and scope as are customary in primary underwritten offerings, addressed and delivered to the underwriter(s) and (D) have appropriate officers of the Company prepare and make presentations at any "road shows" and before analysts and rating agencies, as the case may be, and other informational meetings organized by the underwriters, and take other actions to obtain ratings for any Registrable Securities (if they are eligible to be rated);

(vii) make available for inspection by each seller of Registrable Securities, any underwriter participating in any disposition pursuant to such Registration Statement, and any attorney, accountant or other agent retained by such seller or underwriter, all financial and other records, pertinent corporate documents and properties of the Company, and use its reasonable best efforts to cause the Company's officers, directors, employees and independent accountants to supply all information reasonably requested by such seller, underwriter, attorney, accountant or agent in connection with such Registration Statement;

(viii) use its reasonable best efforts to cause all such Registrable Securities to be listed on each securities exchange on which the Equity Securities are then listed or, if they are not listed, on the New York Stock Exchange or the Nasdaq Global Market, as determined by the Company;

(ix) provide a transfer agent and registrar for all Registrable Securities not later than the effective date of such Registration Statement;

(x) if requested, use its reasonable best efforts to cause to be delivered, immediately prior to the pricing of any underwritten offering, immediately prior to effectiveness of each Registration Statement (and, in the case of an underwritten offering, at the time of closing of the sale of Registrable Securities pursuant thereto), letters from the Company's independent registered public accountants addressed to the sellers of Registrable Securities and each underwriter, if any, stating that such accountants are independent public accountants within the meaning of the Securities Act or other applicable rule or regulation, and otherwise in customary form and covering such financial and accounting matters as are customarily covered by letters of the independent registered public accountants delivered in connection with primary underwritten public offerings; and

(xi) promptly notify the sellers of Registrable Securities and Stockholders' Counsel and the underwriter or underwriters, of the following events, if any:

(A) when the Registration Statement, any pre-effective amendment, the prospectus or any prospectus supplement or post-effective amendment to the Registration Statement has been filed and, with respect to the Registration Statement or any post-effective amendment, when the same has become effective;

(B) of any written request by the Commission for amendments or supplements to the Registration Statement or prospectus;

(C) of the notification to the Company by the Commission of its initiation of any proceeding with respect to, or the issuance by the Commission of any stop order suspending the effectiveness of, the Registration Statement; and

(D) of the receipt by the Company of any notification with respect to the suspension of the qualification of any Registrable Securities for sale under the applicable securities or blue sky laws of any jurisdiction.

(b) The Company shall furnish to Stockholders' Counsel, sellers of Registrable Securities or any underwriter (i) promptly after the same is prepared and publicly distributed, filed with the Commission, or received by the Company, copies of each Registration Statement and any amendment thereto, each preliminary prospectus and prospectus and each amendment or supplement thereto, each letter written by or on behalf of the Company to the Commission, and each item of correspondence from the Commission, in each case relating to such Registration Statement, and (ii) such number of copies of a prospectus, including a preliminary prospectus, and all amendments and supplements thereto and such other documents as Stockholders' Counsel, sellers of Registrable Securities or any underwriter may reasonably request in order to facilitate the disposition of the Registrable Securities. The Company will promptly notify sellers and Stockholders' Counsel of the effectiveness of each Registration Statement or any post-effective amendment. The Company will respond reasonably promptly to any and all comments received from the Commission, with a view towards causing each Registration Statement or any amendment thereto to be declared effective by the Commission as soon as practicable and shall file an acceleration request as soon as practicable following the resolution or clearance of all comments by the Commission, if applicable, following notification by the Commission that any such Registration Statement or any amendment thereto will not be subject to further review.

1.6. Expenses.

(a) All expenses incurred in connection with each registration pursuant to, and incident to the Company's performance of or compliance with, this Article I, including all registration and filing fees, fees and expenses of compliance with securities or blue sky laws, listing application fees, printing expenses, transfer agent's and registrar's fees, cost of distributing prospectuses in preliminary and final form as well as any supplements thereto, fees and disbursements of counsel for the Company and all accountants and other Persons retained by the Company and the reasonable fees and disbursements of one U.S. counsel for each Entity Investor, plus any local counsel needed to deliver legal opinions to the underwriters (the "Stockholders' Counsel") (all such expenses being herein called "Registration Expenses") (but not including any underwriting discounts or commissions or transfer taxes, if any, attributable to the sale of Registrable Securities, which shall be borne by the applicable seller of Registrable

Securities), shall be borne by the Company. In addition, the Company shall pay its internal expenses (including all salaries and expenses of its officers and employees performing legal or accounting duties), the expense of any annual audit or quarterly review, the expense of any liability insurance and the expenses and fees for listing the securities to be registered on each securities exchange on which they are to be listed.

(b) The obligation of the Company to bear the expenses described in Section 1.6(a) shall apply irrespective of whether a registration, once properly demanded, if applicable, becomes effective, is withdrawn or suspended or is converted to another form of registration and irrespective of when any of the foregoing shall occur.

1.7. Indemnification.

(a) The Company shall indemnify and hold harmless, to the fullest extent permitted by law, each Holder and each of their respective officers, directors, employees and Affiliates and each Person who controls such Holder (within the meaning of the Securities Act) against any losses, claims, damages, liabilities, joint or several, and expenses (each, a "Loss") arising out of or based upon (i) any untrue or alleged untrue statement of a material fact contained in any Registration Statement, prospectus, preliminary prospectus or free writing prospectus or any amendment thereof or supplement thereto or in any application for listing on a national securities exchange, or (ii) any omission or alleged omission of a material fact required to be stated therein or necessary to make the statements therein (in the case of a prospectus, in light of the circumstances under which they were made) not misleading or (iii) any violation by the Company of the Securities Act, the Exchange Act or applicable "blue sky" laws, except insofar as the same are made in reliance and in conformity with information relating to such Holder, furnished in writing to the Company by such Holder, expressly for use therein.

(b) In connection with any Registration Statement that includes Registrable Securities owned by any Holder, such Holder shall furnish to the Company in writing such information and affidavits as the Company reasonably requests for use in connection with any such Registration Statement or prospectus and shall indemnify and hold harmless the Company, its directors and officers, and each other Person who controls the Company (within the meaning of the Securities Act) against any Losses to which the Company or any such director or officer or controlling Person may become subject under the Securities Act or otherwise, insofar as such Losses arise out of or are based upon (i) any untrue or alleged untrue statement of material fact contained in the Registration Statement, prospectus, preliminary prospectus or free writing prospectus or any amendment thereof or supplement thereto or in any application for listing on a national securities exchange or (ii) any omission or alleged omission of a material fact required to be stated therein or necessary to make the statements therein not misleading, but only to the extent that such untrue statement or omission is made in such Registration Statement, any such prospectus or preliminary prospectus or any amendment or supplement thereto, or in any such application, in reliance upon and in conformity with written information prepared and furnished to the Company by a Holder expressly for use therein, and such Holder will reimburse the Company and each such director, officer and controlling Person for any legal or any other expenses actually and reasonably incurred by them in connection with investigating, defending or settling any such loss, claim, liability, action or proceeding; provided that the obligation to indemnify and hold harmless will be limited to the net amount of proceeds received by such Holder from the sale of Registrable Securities pursuant to such Registration Statement.

(c) In case any proceeding (including any governmental investigation) will be instituted involving any Person in respect of which indemnity may be sought pursuant to Section 1.7(a) or (b), such Person (hereinafter called the "indemnified party") will promptly notify the Person against whom such indemnity may be sought (hereinafter called the "indemnifying party") in writing and the indemnifying party, upon request of the indemnified party, will retain counsel reasonably satisfactory to the indemnified party to represent the indemnified party and will pay the fees and disbursements of such counsel related to such proceeding. In any such proceeding, any indemnified party will have the right to retain its own counsel, but the fees and expenses of such counsel will be at the expense of such indemnified party unless (i) the indemnifying party and the indemnified party will have mutually agreed to the retention of such counsel or (ii) the named parties to any such proceeding (including any impeded parties) include both the indemnifying party and the indemnified party and the indemnified party will have been advised by counsel that representation of both parties by the same counsel would be inappropriate due to actual or potential differing interests between them. It is understood that the indemnifying party will not, in connection with any proceeding or related proceedings in the same jurisdiction, be liable for the reasonable fees and expenses of more than one separate firm of attorneys (in addition to any local counsel) at any time for all such indemnified parties, and that all such reasonable fees and expenses will be reimbursed as they are incurred. In the case of the retention of any such separate firm for the indemnified parties, such firm will be designated in writing by the indemnified parties. The indemnifying party will not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there shall be a final judgment for the plaintiff, the indemnifying party agrees to indemnify the indemnified party from and against any loss or liability by reason of such settlement or judgment. Notwithstanding the foregoing sentence, if at any time an indemnified party will have requested an indemnifying party to reimburse the indemnified party for reasonable fees and expenses of counsel as contemplated by the third sentence of this Section 1.7(c), the indemnifying party agrees that it will be liable for any settlement of any proceeding effected without its written consent if (i) such settlement is entered into more than 30 days after receipt by such indemnifying party of the aforesaid request and (ii) such indemnifying party will not have reimbursed the indemnified party in accordance with such request or reasonably objected in writing, on the basis of the standards set forth herein, to the propriety of such reimbursement prior to the date of such settlement. No indemnifying party will, without the prior written consent of the indemnified party, effect any settlement of any pending or threatened proceeding in respect of which any indemnified party is or could have been a party and indemnity could have been sought hereunder by such indemnified party, unless such settlement includes an unconditional release of such indemnified party from all liability on claims that are the subject matter of such proceeding.

(d) The provisions of this Section 1.7 shall survive the transfer of securities and any termination of this Agreement.

(e) If the indemnification provided for in or pursuant to this Section 1.7 is due in accordance with the terms hereof, but is held by a court to be unavailable or unenforceable in respect of any Losses, then each applicable indemnifying party, in lieu of indemnifying such indemnified party, shall contribute to the amount paid or payable by such indemnified Person as a result of such Losses in such proportion as is appropriate to reflect the relative fault of the indemnifying party, on the one hand, and of the indemnified party, on the other hand, in connection with the statements or omissions that result in such Losses as well as any other

relevant equitable considerations. The relative fault of the indemnifying party, on the one hand, and of the indemnified Person, on the other hand, shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the indemnifying party or by the indemnified party, and by such party's relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission. The parties agree that it would not be just and equitable if contribution pursuant to this Section 1.7(e) were determined by *pro rata* allocation or by any other method of allocation that does not take into account the equitable considerations referred to in this Section 1.7(e). No Person guilty of "fraudulent misrepresentation" (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation. If indemnification is available under this Section 1.7, the indemnifying party will indemnify each indemnified party to the full extent provided in Sections 1.7(a) and (b) without regard to the relative fault of said indemnifying party or indemnified party or any other equitable consideration provided for in this Section 1.7(e).

(f) The Company hereby acknowledges and agrees that any of the Persons entitled to indemnification pursuant to Section 1.7(a) (each, a Company Indemnitee) may have certain rights to indemnification, advancement of expenses and/or insurance provided by other sources. The Company hereby acknowledges and agrees (i) that it is the indemnitor of first resort (i.e., its obligations to a Company Indemnitee are primary and any obligation of such other sources to advance expenses or to provide indemnification for the same expenses or liabilities incurred by such Company Indemnitee are secondary) and (ii) that it shall be required to advance the full amount of expenses incurred by a Company Indemnitee and shall be liable for the full amount of all expenses, judgments, penalties, fines and amounts paid in settlement to the extent legally permitted and as required by the terms of this Agreement without regard to any rights a Company Indemnitee may have against such other sources. The Company further agrees that no advancement or payment by such other sources on behalf of a Company Indemnitee with respect to any claim for which such Company Indemnitee has sought indemnification, advancement of expenses or insurance from the Company shall affect the foregoing, and that such other sources shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of such Company Indemnitee against the Company.

1.8. Participation in Underwritten Registrations

(a) No Holder may participate in any registration hereunder that is underwritten unless such Holder (i) agrees to sell its Registrable Securities on the basis provided in any customary underwriting arrangements (including pursuant to the terms of any over-allotment or "green shoe" option requested by the underwriter(s); provided that no Holder will be required to sell more than the number of Registrable Securities that such Holder has requested the Company to include in any registration), (ii) completes and executes all questionnaires, powers of attorney, indemnities, underwriting agreements and other documents reasonably required under the terms of such underwriting arrangements and (iii) cooperates with the Company's reasonable requests in connection with such registration or qualification (it being understood that the Company's failure to perform its obligations hereunder, which failure is caused by such Holder's failure to cooperate, will not constitute a breach by the Company of this Agreement). Notwithstanding the foregoing, no Holder will be required to agree to any indemnification obligations on the part of such Holder that are greater than its obligations pursuant to Section 1.7(b).

(b) Each Holder that is participating in any registration hereunder agrees that, upon receipt of any notice from the Company of the happening of any event of the kind described in Section 1.5(a)(iv), such Holder will forthwith discontinue the disposition of its Registrable Securities pursuant to the Registration Statement until such Holder receives copies of a supplemented or amended prospectus as contemplated by such Section 1.5(a)(iv). In the event the Company gives any such notice, the applicable time period mentioned in Section 1.5(a)(ii) during which a Registration Statement is to remain effective will be extended by the number of days during the period from and including the date of the giving of such notice pursuant to Section 1.5(a)(iv) to and including the date when each seller of a Registrable Security covered by such Registration Statement will have received the copies of the supplemented or amended prospectus contemplated by Section 1.5(a)(iv).

1.9. Rule 144. The Company covenants that: (a) to the extent applicable, it will make available adequate current public information with respect to the Company meeting the information requirements of Rule 144(c) under the Securities Act, and upon the request of any Stockholder, the Company will deliver to such Stockholder a written statement as to whether it has complied with such information requirements; and (b) that it will take such further action as any Stockholder may reasonably request to enable such Stockholder to sell Registrable Securities without registration under the Securities Act pursuant to the exemption provided by Rule 144.

1.10. Transfer of Registration Rights. The Holders may transfer and assign all or any portion of their then remaining registration rights under this Article I to any Permitted Transferee of such Holder. In connection with any such transfer and assignment, the term "Holder" as used in this Article I shall, where appropriate to assign such rights to such Permitted Transferee, be inclusive of the Holder and such Permitted Transferee. After any such Transfer and assignment, such Holder shall retain its rights under this Article I with respect to all other Registrable Securities owned by such Holder.

1.11. Holdback. In consideration for the Company agreeing to its obligations under this Agreement, each Stockholder agrees in connection with any registration or sale of Registrable Securities conducted as an underwritten Public Offering (whether or not such Stockholder is participating in such underwritten Public Offering) upon the request of the Company and the underwriters managing such underwritten Public Offering, to become bound by and to execute and deliver a lock-up agreement with the underwriters managing such underwritten Public Offering restricting such Stockholder's right to effect, and to cause their respective Controlled Affiliates not to effect (other than pursuant to such registration) any public sale or distribution of Common Stock, including any sale pursuant to Rule 144 or Rule 144A, or make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any Common Stock, any other Equity Securities of the Company or any securities convertible into or exchangeable or exercisable for any Equity Securities of the Company without the prior written consent of the Company or such underwriters, as the case may be, during the Holdback Period so long as all Stockholders or stockholders participating in such registration or holding more than (including any Stockholders who are members of a Group holding more than) 5% of the outstanding Equity Securities are bound by a comparable obligation; provided that nothing herein will prevent any Stockholder from making a Transfer of Registrable Securities to any Permitted Transferee or

Involuntary Transferee of such Stockholder, so long as any such Transferee agrees to be so bound. The terms of such lock-up agreements shall be negotiated among the CCMP Investors, the Company and the underwriters and shall include customary carve outs from the transfer restrictions set forth therein, including a carve out with respect to the transfer of Common Stock pursuant to trading plans established prior to the date of the applicable lock-up agreement under Rule 10b5-1 under the Exchange Act. The Company further agrees not to effect (other than pursuant to such registration or pursuant to a Special Registration) any public sale or distribution, or to file any Registration Statement (other than such registration or a Special Registration) covering any of its Equity Securities or any securities convertible into or exchangeable or exercisable for its Equity Securities, during the Holdback Period with respect to an underwritten offering, if required by the managing underwriter; provided that notwithstanding anything to the contrary herein, the Company's obligations under this Section 1.11 shall not apply during any 12-month period for more than an aggregate of 180 days with respect to any Short-Form Registrations.

ARTICLE II DEFINITIONS

2.1. Certain Definitions.

"Affiliate" means, with respect to any Person, (i) any Person directly or indirectly Controlling, Controlled by or under common Control with such Person, (ii) any Person directly or indirectly owning or Controlling 10% or more of any class of outstanding voting securities of such Person or (iii) any officer, director, general partner or trustee of any such Person described in clause (i) or (ii); provided that neither the Company nor any of its subsidiaries shall be deemed an Affiliate of the CCMP Investors or the INEOS Investor.

"Agreement" has the meaning set forth in the Preamble.

"Applicable Law" means all applicable provisions of (i) constitutions, treaties, statutes, laws (including the common law), rules, regulations, ordinances, codes or orders of any Governmental Entity, (ii) any consents or approvals of any Governmental Entity, (iii) any orders, decisions, injunctions, judgments, awards, decrees of or agreements with any Governmental Entity and (iv) regulations of any self-regulatory organization.

"Board" means the board of directors of the Company.

"Business Day" means a day other than a Saturday, Sunday or other day on which commercial banks in New York City are authorized or required to close.

"CCMP" has the meaning set forth in the Preamble.

"CCMP Investors" has the meaning set forth in the Preamble.

"Commission" means the Securities and Exchange Commission.

"Common Stock" means the Common Stock, par value \$0.01 per share, of the Company and any securities issued in respect thereof, or in substitution therefor, in connection with any stock split, dividend or combination, or any reclassification, recapitalization, merger, consolidation, exchange or similar reorganization.

“Company” has the meaning set forth in the Preamble.

“Company Indemnitee” has the meaning set forth in Section 1.7(f).

“Competitor” means a Person, or another Person that Controls or is Controlled by a Person who competes directly or indirectly with the Company or any Material Subsidiary; provided that the INEOS Investor and its Affiliates shall not be deemed a Competitor of the Company or any Material Subsidiary.

“Control” means the power to direct the affairs of a Person by reason of ownership of voting securities, by contract or otherwise.

“Cutback Event” has the meaning set forth in Section 1.4(a).

“Demand Registration” has the meaning set forth in Section 1.1(a).

“Effective Date” means the date of this Agreement.

“Entity Investors” has the meaning set forth in the Preamble.

“Equity Securities” means any and all shares of Common Stock, securities of the Company convertible into, or exchangeable or exercisable for, any shares of Common Stock, any other shares of capital stock or interests or participations that confer on a Person the right to receive a share of the profits and losses of, or distribution of assets of, the Company, and options, warrants or other rights to acquire any such Equity Securities.

“Exchange Act” means the Securities Exchange Act of 1934, as amended from time to time, and the rules and regulations promulgated thereunder.

“Existing Agreement” has the meaning set forth in the Recitals.

“Governmental Entity” means any federal, state, local or foreign court, legislative, executive or regulatory authority or agency.

“Group” has the meaning assigned to such term in Section 13(d)(3) of the Exchange Act.

“Holdback Period” means, with respect to an underwritten Public Offering, the period commencing on the date of the final prospectus relating to such underwritten Public Offering and ending on the date specified by the relevant underwriters (such period not to exceed 90 days).

“Holders” means Stockholders party to this Agreement who hold Registrable Securities at the time in question.

“indemnified party” has the meaning set forth in Section 1.7(c).

“indemnifying party” has the meaning set forth in Section 1.7(c).

“INEOS Investor” has the meaning set forth in the Preamble.

“Information” means all information about the Company or any of its Subsidiaries that is or has been furnished to any Stockholder or any of its Representatives by or on behalf of the Company or any of its Subsidiaries, or any of their respective Representatives (whether written or oral or in electronic or other form and whether prepared by the Company, its Representatives or otherwise), together with all written or electronically stored documentation prepared or developed by such Stockholder or its Representatives based on, containing or otherwise reflecting, in whole or in part, any of such information, including any notes, memoranda, analyses, forecasts, compilations, studies or other data; provided that the term “Information” does not include any information that (i) is or becomes generally available to the public other than as a result of a disclosure by any Stockholder or its Representatives, (ii) is or becomes available to such Stockholder on a nonconfidential basis from a source, other than the Company or any of its Subsidiaries, or any of their respective Representatives, that to the best of such Stockholder’s knowledge, after reasonable inquiry, is not prohibited from disclosing such portions to such Stockholder by a contractual, legal or fiduciary obligation of confidentiality to the Company or any other party with respect to such information or (iii) was, is or becomes independently developed by such Stockholder or any of its Representatives, without reference to the Information disclosed to it.

“Involuntary Transfer” means any Transfer, other than by voluntary act of a Stockholder, or any proceeding or action by or in which a Stockholder shall be deprived or divested of any right, title or interest in or to any Equity Securities or any Equity Securities shall become encumbered, whether or not such Stockholder consents to such proceeding or action, including (a) any seizure under levy of attachment or execution, (b) any foreclosure upon a pledge of, or a security interest in, Equity Securities, (c) any Transfer in connection with bankruptcy or similar proceedings relating to a Stockholder, (d) any Transfer to a state or to a public officer or agency pursuant to any statute pertaining to escheat or abandoned property, (e) any Transfer in connection with the disposition of the community property interest of such Stockholder’s spouse, (f) any Transfer upon the death of such Stockholder, (g) any Transfer occasioned by the incompetence of such Stockholder, or (h) any Transfer to a Stockholder’s spouse as a result of the termination of the marital relationship. “Involuntary Transferee” shall have a corresponding meaning.

“IPO” has the meaning set forth in the Recitals.

“Legal Process” has the meaning set forth in Section 3.2.

“Loss” has the meaning set forth in Section 1.7(a).

“Mandatory Distribution” means with respect to a Stockholder, any liquidation of, or distribution with respect to an equity interest in, such Stockholder (including any distribution by a Stockholder to one or more of its limited partners) that is (i) required by Applicable Law, (ii) made solely to any limited partner of the Stockholder that is withdrawing from such Stockholder in connection with a Regulatory Problem or (iii) in the case of the Entity Investors, required under the organizational documents or governing agreements of such Stockholder; provided that any general partner, managing member, board of directors or similar governing body of such Stockholder (including in connection with any determination such Person has made that resulted in such requirement under such documents or agreement), and its equityholders, have taken all reasonable efforts to avoid such required liquidation or distribution.

“Material Subsidiary” means, as of any determination date, any Subsidiary of the Company that, together with its Subsidiaries, has revenues representing 5% or more of the aggregate total revenues of the Company and its Subsidiaries for the most recently completed fiscal year or assets representing 5% or more of the aggregate total assets of the Company and its Subsidiaries for the most recently completed fiscal year.

“Permitted Transferee” means, as to any Stockholder:

(i) the owners of such Stockholder in connection with a Mandatory Distribution or any other liquidation of, or a distribution with respect to an equity interest in, such Stockholder (including any distribution by a Stockholder to its limited partners),

(ii) a Subsidiary of such Stockholder (other than any “portfolio company” described below),

(iii) any Person directly or indirectly Controlled by or under common Control with such Stockholder; and, in the case of any CCMP Investor, (A) any limited partnership, limited liability company or other investment vehicle that is Controlled, sponsored or managed (including as a general partner or through the management of investments) by any CCMP Investor or any of its Affiliates, or (B) any present or former managing director, general partner, director, limited partner, officer or employee of any entity described in clause (A) immediately above or any spouse, lineal descendant, sibling, parent, heir, executor, administrator, trustee or beneficiary of any of the foregoing persons described in this clause (B), or

(iv) the Company or any of its Subsidiaries;

provided that in no event shall (x) any “portfolio company” (as such term is customarily used among institutional investors) of any Stockholder or any entity Controlled by any portfolio company of any Stockholder or (y) any Competitor constitute a “Permitted Transferee.” Any Stockholder shall also be a Permitted Transferee of the Permitted Transferees of itself. Each Entity Investor shall be a Permitted Transferee of the other Entity Investor.

“Person” means any individual, corporation, limited liability company, limited or general partnership, joint venture, association, joint-stock company, trust, unincorporated organization, government or any agency or political subdivisions thereof or any Group comprised of two or more of the foregoing.

“Piggyback Notice” has the meaning set forth in Section 1.3.

“Piggyback Registration” has the meaning set forth in Section 1.3.

“Potential Takedown Participant” has the meaning set forth in Section 1.2(b).

“Public Offering” means an offering of Common Stock pursuant to a registration statement filed in accordance with the Securities Act.

“Registrable Securities” means (a) all shares of Common Stock, (b) any other stock or securities that the Stockholders may be entitled to receive, or will have received pursuant to such Stockholders’ ownership of the Common Stock, in lieu of or in addition to Common Stock, or (c) any Equity Securities issued or issuable directly or indirectly with respect to the securities referred to in the foregoing clause (a) or (b) by way of conversion or exchange thereof or share dividend or share split or in connection with a combination of shares, recapitalization, reclassification, merger, amalgamation, arrangement, consolidation or other reorganization. As to any particular securities constituting Registrable Securities, such securities will cease to be Registrable Securities when (x) they have been effectively registered or qualified for sale by prospectus filed under the Securities Act and disposed of in accordance with the related Registration Statement, (y) they have been sold pursuant to Rule 144 or another exemption from registration under the Securities Act or (z) they are able to be sold by the Stockholder holding them without restriction as to volume or manner of sale pursuant to Rule 144 under the Securities Act.

“Registration Expenses” has the meaning set forth in Section 1.6(a).

“Registration Request” has the meaning set forth in Section 1.1(a).

“Registration Statement” means any registration statement of the Company filed pursuant to the Securities Act that covers an offering of any Registrable Securities, and all amendments and supplements to any such registration statement, including post-effective amendments, in each case including the prospectus contained therein, all exhibits thereto and all material incorporated by reference therein.

“Regulatory Problem” means a change in Applicable Law that makes the investment by the applicable limited partner in such Stockholder illegal for such limited partner.

“Representatives” means with respect to any Person, any of such Person’s, or its Affiliates’, directors, officers, employees, general partners, Affiliates, direct or indirect shareholders, members or limited partners, attorneys, accountants, financial and other advisers, and other agents and representatives.

“Rule 144” means Rule 144 under the Securities Act (or any successor rule).

“Securities Act” means the Securities Act of 1933, as amended from time to time, and the rules and regulations promulgated thereunder.

“Shelf Registration Statement” has the meaning set forth in Section 1.1(b).

“Shelf Takedown Notice” has the meaning set forth in Section 1.2(b).

“Shelf Takedown Request” has the meaning set forth in Section 1.2(a).

“Short-Form Registrations” has the meaning set forth in Section 1.1(b).

“Special Registration” means the registration of (a) Equity Securities solely registered on FormS-4 or Form S-8 or (b) shares of equity securities and/or options or other rights in respect thereof to be offered to directors, members of management, employees, consultants or sales agents, distributors or similar representatives of the Company or its Subsidiaries or in connection with dividend reinvestment plans.

“Stockholders” means (i) the Entity Investors and (ii) any other holder of any Equity Securities that is a party to this Agreement on the Effective Date;provided that any Person shall cease to be a Stockholder if it no longer is the holder of any Equity Securities.

“Stockholders’ Counsel” has the meaning set forth in Section 1.6(a).

“Subsidiary” means each Person in which a Person owns or Controls, directly or indirectly, capital stock or other equity interests representing more than 50% of the outstanding capital stock or other equity interests.

“Transfer” means, directly or indirectly, to sell, transfer, assign, pledge, encumber, hypothecate or similarly dispose of, either voluntarily or involuntarily, or to enter into any contract, option or other arrangement or understanding with respect to the sale, transfer, assignment, pledge, encumbrance, hypothecation or similar disposition of, any shares of Equity Securities owned by a Person or any rights to vote or options to acquire or dispose of any interest (including to a beneficial interest) in any shares of Equity Securities owned by a Person.

“Transferee” means any Person to whom any Stockholder or any Transferee thereof Transfers Equity Securities of the Company in accordance with the terms hereof.

“Underwritten Shelf Takedown” means an underwritten Public Offering in which shares of Common Stock are sold to an underwriter or underwriters on a firm commitment basis for reoffer to the public, including via a block trade, under and pursuant to an effective Shelf Registration Statement.

“Voting Securities” means, at any time, shares of any class of Equity Securities of the Company that are then entitled to vote generally in the election of directors.

2.2. Terms Generally. The words “hereby”, “herein”, “hereof”, “hereunder” and words of similar import refer to this Agreement as a whole (including the Exhibits hereto) and not merely to the specific section, paragraph or clause in which such word appears. All references herein to Articles, Sections and Exhibits shall be deemed references to Articles and Sections of, and Exhibits to, this Agreement unless the context shall otherwise require. The words “include”, “includes” and “including” shall be deemed to be followed by the phrase “without limitation”. The definitions given for terms in this Article II and elsewhere in this Agreement shall apply equally to both the singular and plural forms of the terms defined. Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms. References herein to any agreement or letter shall be deemed references to such agreement or letter as it may be amended, restated or otherwise revised from time to time.

ARTICLE III
MISCELLANEOUS

3.1. Termination. This Agreement or any provision thereof may be terminated by written agreement of the Company and the Stockholders as provided under Section 3.8; provided that this agreement shall terminate automatically upon the date on which no Holder holds any Registrable Securities, except for Section 1.7 and Articles II and III, which shall survive any such termination. Nothing in this Agreement shall relieve any party from any liability for the breach of any obligations set forth in this Agreement.

3.2. Publicity. No Stockholder may issue any press release or otherwise make any public announcement or comment with respect to the Company or any of its Subsidiaries, without the prior consent of the Board; provided that nothing herein shall prevent any party hereto from making such announcement or comment (a) upon the order of any court or administrative agency, (b) upon the request or demand of any regulatory agency or authority having jurisdiction over such party, (c) to the extent required or compelled by applicable law or any legal process or required or requested pursuant to subpoena, interrogatories or other discovery requests (any of the foregoing, a "Legal Process"); provided, further, that such party shall notify the other parties hereto, to the extent legally permissible, of the proposed disclosure as far in advance of such disclosure as reasonably practicable.

3.3. Confidentiality. Each party hereto agrees to, and shall cause its Representatives to, keep confidential and not divulge any Information, and to use, and cause its Representatives to use, such Information only in connection with the operation and preparation of tax returns of the Company and its Subsidiaries; provided that nothing herein shall prevent any party hereto from disclosing such Information (a) pursuant to and as contemplated by Article I hereof, (b) pursuant to applicable law or a Legal Process, (c) to the extent necessary in connection with the exercise of any remedy hereunder, (d) to other Stockholders, (e) to such party's Representatives that in the reasonable judgment of such party need to know such Information, (f) to any Permitted Transferee in connection with a proposed Transfer of Equity Securities from such Stockholder as long as such potential Transferee agrees to be bound by the provisions of this Section 3.3 as if it were a Stockholder or (g) in the case of the Entity Investors, (i) in connection with financial or operating reports made available to the limited partners, investors, managers, members, representatives and advisors of the Entity Investors or any of their Affiliates, (ii) in compliance with the terms of the limited partnership or other organizational documents of the Entity Investors or any of their Affiliates, or (iii) in connection with the marketing of investment funds managed or advised, directly or indirectly, by the Entity Investors or any of their Affiliates; provided, further, that, in the case of clause (a), such party shall notify the other parties hereto of the proposed disclosure as far in advance of such disclosure as reasonably practicable and use reasonable efforts to ensure that any Information so disclosed is accorded confidential treatment, when and if available.

3.4. Compliance. The Stockholders shall cooperate in good faith to procure that the Company take such necessary action and exercise all necessary powers so that the Company and its Subsidiaries are compliant with the provisions of the Securities Act and Exchange Act, to the extent applicable to the Company or any such Subsidiary.

3.5. Further Assurances. Each party hereto shall do and perform or cause to be done and performed all such further acts and things, and shall execute and deliver all such further agreements, certificates, instruments and documents, as any other party hereto reasonably may request in order to carry out the provisions of this Agreement and the consummation of the transactions contemplated hereby. With respect to any reference herein to any approval, consent or similar concept of the CCMP Investors, the approval, consent, etc., of the CCMP Investors holding a majority of the Voting Securities held by all of the CCMP Investors shall satisfy any such approval, consent, etc., requirement.

3.6. No Recourse. Notwithstanding anything to the contrary in this Agreement, the Company and each Stockholder agrees and acknowledges that, to the fullest extent permitted by Applicable Law, no recourse under this Agreement, or any documents or instruments delivered in connection with this Agreement, shall be had against any current or future director, officer, employee, general or limited partner or member of any Stockholder or of any Affiliate or assignee thereof, whether by the enforcement of any assessment or by any legal or equitable proceeding, or by virtue of any statute, regulation or other Applicable Law, it being expressly agreed and acknowledged that no personal liability whatsoever shall attach to, be imposed on or otherwise be incurred by any current or future officer, agent or employee of any Stockholder or any current or future member of any Stockholder or any current or future director, officer, employee, partner or member of any Stockholder or of any Affiliate or assignee thereof, as such, for any obligation of any Stockholder under this Agreement or any documents or instruments delivered in connection with this Agreement for any claim based on, in respect of or by reason of such obligations or their creation.

3.7. Amendment; Waivers, etc. This Agreement may be amended, and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if any such amendment, action or omission to act, has been approved by Stockholders holding in excess of 75% of the then-outstanding Registrable Securities of the Stockholders; provided that this Agreement may not be amended in a manner adversely affecting the rights or obligations of any Stockholder which does not adversely affect the rights or obligations of all similarly situated Stockholders in the same manner without the consent of such Stockholder. The failure of any party to enforce any of the provisions of this Agreement shall in no way be construed as a waiver of such provisions and shall not affect the right of such party thereafter to enforce each and every provision of this Agreement in accordance with its terms. Any Stockholder may waive (in writing) the benefit of any provision of this Agreement with respect to itself for any purpose. Any such waiver shall constitute a waiver only with respect to the specific matter described in such writing and shall in no way impair the rights of the Stockholder granting such waiver in any other respect or at any other time.

3.8. Assignment. Except as contemplated by Section 1.10, neither this Agreement nor any right or obligation arising under this Agreement may be assigned by any party without the prior written consent of the Entity Investors. Any purported assignment without such prior written consent will be void.

3.9. Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors and permitted assigns.

3.10. No Third Party Beneficiaries. Except as provided in Sections 1.7 and 3.6, nothing in this Agreement shall confer any rights upon any Person other than the parties hereto and each such party's respective heirs, successors and permitted assigns.

3.11. Notices. All notices, requests, demands, waivers and other communications required or permitted to be given under this Agreement shall be in writing and shall be deemed to have been duly given if (a) delivered personally, (b) mailed, by certified or registered mail

with postage prepaid, (c) sent by reputable overnight courier or (d) sent by fax or e-mail (provided a confirmation copy is sent by one of the other methods set forth above), as follows (or to such other address as the party entitled to notice shall hereafter designate in accordance with the terms hereof):

If to the Company, to it at:

PQ Group Holdings Inc.
300 Lindenwood Drive
Valleybrooke Corporate Center
Malvern, PA 19355-1740
Attention: Joseph S. Koscinski
Facsimile: (610) 651-4273
E-mail: joe.koscinski@pqcorp.com

with a copy to (which shall not constitute notice) each of the Entity Investors and their counsel at the addresses listed below.

If to the CCMP Investors, to them at:

CCMP Capital Advisors, LP
277 Park Avenue, 27th Floor
New York, New York 10172
Attention: Richard Jansen, Esq. and Official Notice Clerk
Facsimile: (212) 599-3481
E-mail: richard.jansen@ccmpcapital.com

with a copy to (which shall not constitute notice):

Ropes & Gray LLP
Prudential Tower
800 Boylston Street
Boston, MA 02199-3600
Attention: Craig E. Marcus, Esq.
Facsimile: (617) 235-0514
E-mail: craig.marcus@ropesgray.com

If to the INEOS Investor, to it at:

INEOS
Hawkslease, Chapel Lane
Lyndhurst, Hampshire SO43 7FG
Attention: Jonny Ginns
Facsimile: +44 (0)23 8028 7069
E-mail: jonny.ginns@ineos.com

with a copy to (which shall not constitute notice):

Cravath, Swaine & Moore LLP
825 Eighth Avenue
New York, New York 10019
Attention: Craig F. Arcella
Facsimile: (212) 474-3700
E-mail: carcella@cravath.com

If to any other Stockholder, to its address set forth on the signature page of such Stockholder to this Agreement (or any joinder agreement) with a copy (which shall not constitute notice) to any party so indicated thereon. All such notices, requests, demands, waivers and other communications shall be deemed to have been received (w) if by personal delivery, on the day delivered, (x) if by certified or registered mail, on the day delivered, (y) if by overnight courier, on the day delivered, or (z) if by fax or e-mail, on the day delivered (provided the fax or e-mail is promptly confirmed by telephone confirmation thereof).

3.12. Severability. Any term or provision of this Agreement which is invalid, illegal or unenforceable in any jurisdiction shall, as to that jurisdiction, be ineffective to the extent of such invalidity, illegality or unenforceability without rendering invalid, illegal or unenforceable the remaining terms and provisions of this Agreement or affecting the validity, illegality or enforceability of any of the terms or provisions of this Agreement in any other jurisdiction. If any provision of this Agreement is so broad as to be unenforceable, the provision shall be interpreted to be only so broad as is enforceable. Upon such determination that any term or other provision is invalid, illegal or incapable of being enforced, the parties shall negotiate in good faith to modify this Agreement so as to effect the original intent of the parties as closely as possible in a mutually acceptable manner in order that the transactions contemplated herein are consummated as originally contemplated to the fullest extent possible.

3.13. Headings. The headings contained in this Agreement are for purposes of convenience only and shall not affect the meaning or interpretation of this Agreement.

3.14. Entire Agreement. This Agreement, together with the Exhibits hereto, constitute the entire agreement and supersede all prior agreements and understandings, both written and oral, among the parties with respect to the subject matter hereof.

3.15. Governing Law. This Agreement will be governed by and construed in accordance with the laws of the State of Delaware (regardless of the laws that might otherwise govern under applicable principles or rules of conflicts of law to the extent such principles or rules are not mandatorily applicable by statute and would require the application of the laws of another jurisdiction).

3.16. Consent to Jurisdiction. Each party irrevocably submits to the exclusive jurisdiction of (a) the Supreme Court of the State of New York, New York County, and (b) the United States District Court for the Southern District of New York, and in each case any appellate court thereof, for the purposes of any suit, action or other proceeding arising out of this Agreement or any transaction contemplated hereby (and agrees not to commence any such suit, action or other proceeding except in such courts). Each party further agrees that service of any process, summons, notice or document by U.S. registered mail to such party's respective address set forth or referred to in Section 3.11 shall, to the fullest extent permitted by Applicable Law, be effective service of process for any such suit, action or other proceeding. Each party irrevocably

and unconditionally waives any objection to the laying of venue of any such suit, action or other proceeding in (i) the Supreme Court of the State of New York, New York County, and (ii) the United States District Court for the Southern District of New York, or, in each case, any appellate court thereof, that any such suit, action or other proceeding brought in any such court has been brought in an inconvenient forum. Nothing in this Agreement will affect the right of any party to this Agreement to serve process in any other manner permitted by Applicable Law.

3.17. Waiver of Jury Trial. Each party hereby waives, to the fullest extent permitted by Applicable Law, any right it may have to a trial by jury in respect of any suit, action or other proceeding arising out of this Agreement or any transaction contemplated hereby. Each party (a) certifies and acknowledges that no representative, agent or attorney of any other party has represented, expressly or otherwise, that such other party would not, in the event of litigation, seek to enforce the foregoing waiver, and (b) acknowledges that it understands and has considered the implications of this waiver and makes this waiver voluntarily, and that it and the other parties have been induced to enter into this Agreement by, among other things, the mutual waivers and certifications in this Section 3.17.

3.18. Enforcement. Each party hereto acknowledges that money damages would not be an adequate remedy in the event that any of the covenants or agreements in this Agreement are not performed in accordance with its terms, and it is therefore agreed that in addition to and without limiting any other remedy or right it may have, the nonbreaching party will have the right to an injunction, temporary restraining order or other equitable relief in any court of competent jurisdiction enjoining any such breach and enforcing specifically the terms and provisions hereof. In the event that the Company or one or more Entity Investors shall file suit to enforce the covenants contained in this Agreement (or obtain any other remedy in respect of any breach thereof), the prevailing party in the suit shall be entitled to recover, in addition to all other damages to which it may be entitled, the costs incurred by such party in conducting the suit, including reasonable attorney's fees and expenses.

3.19. Counterparts; Facsimile Signatures. This Agreement may be executed in any number of counterparts (including via facsimile or other electronic transmission), each of which shall be deemed an original, but all of which together shall constitute one instrument.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement by their authorized representatives as of the date first above written.

PQ GROUP HOLDINGS INC.

By: _____
Name:
Title:

CCMP CAPITAL INVESTORS III, L.P.

By: CCMP Capital Associates III, L.P.,
its general partner

By: CCMP Capital Associates III GP, LLC,
its general partner

By: _____
Name:
Title:

CCMP CAPITAL INVESTORS III (EMPLOYEE), L.P.

By: CCMP Capital Associates III, L.P.,
its general partner

By: CCMP Capital Associates III GP, LLC,
its general partner

By: _____
Name:
Title:

[Signature Page to A&R Stockholders Agreement]

QUARTZ CO-INVEST L.P.

By: CCMP Co-Invest III A GP, LLC,
its general partner

By: _____
Name:
Title:

CCMP CAPITAL INVESTORS III (AV-7), L.P.

By: CCMP Capital Associates III, L.P.,
its general partner

By: CCMP Capital Associates III GP, LLC,
its general partner

By: _____
Name:
Title:

CCMP CAPITAL INVESTORS III (AV-8), L.P.

By: CCMP Capital Associates III, L.P.,
its general partner

By: CCMP Capital Associates III GP, LLC,
its general partner

By: _____
Name:
Title:

[Signature Page to A&R Stockholders Agreement]

CCMP CAPITAL INVESTORS III (AV-9), L.P.

By: CCMP Capital Associates III, L.P.,
its general partner

By: CCMP Capital Associates III GP, LLC,
its general partner

By: _____
Name:
Title:

CCMP CAPITAL INVESTORS III (AV-10), L.P.

By: CCMP Capital Associates III, L.P.,
its general partner

By: CCMP Capital Associates III GP, LLC,
its general partner

By: _____
Name:
Title:

INEOS INVESTMENTS PARTNERSHIP

By: _____
Name:
Title:

[stockholder]

Notice Address:

JOINDER AGREEMENT
TO THE
STOCKHOLDERS AGREEMENT

By execution of this signature page, _____ hereby agrees to become a party to, be bound by the obligations of and receive the benefits of that certain Stockholders Agreement, dated as of [●], 2017, by and among PQ Group Holdings Inc., a Delaware corporation, CCMP Capital Investors III, L.P., a Delaware limited partnership, CCMP Capital Investors III (Employee), L.P., a Delaware limited partnership, Quartz Co-Invest L.P., a Delaware limited partnership, CCMP Capital Investors III (AV-7), L.P., a Delaware limited partnership, CCMP Capital Investors III (AV-8), L.P., a Delaware limited partnership, CCMP Capital Investors III (AV-9), L.P., a Delaware limited partnership, CCMP Capital Investors III (AV-10), L.P., a Delaware limited partnership, INEOS Investments Partnership, a general partnership organized under the laws of England and Wales and the other parties thereto, as amended from time to time thereafter, and shall be deemed to be a "Stockholder" for all purposes thereunder.

By: _____
Name: _____
Title: _____

Notice Address: _____

Accepted:

PQ GROUP HOLDINGS INC.

By: _____
Name: _____
Title: _____

INDEMNIFICATION AGREEMENT

This Indemnification Agreement ("Agreement") is made and entered into as of [●] by and among PQ Group Holdings Inc., a Delaware corporation (the "Company"), PQ Holdings Inc., a Delaware corporation, CPQ Midco I Corporation, a Delaware corporation (together with PQ Holdings Inc., the "Intermediate Holdcos"), PQ Corporation, a Pennsylvania corporation ("Opco"), Eco Services Operations Corp., a Delaware corporation ("Eco"), Potters Industries, LLC, a Delaware limited liability company ("Potters") and together with the Company, the Intermediate Holdcos, Opco and Eco, the "PQ Companies" and each a "PQ Company", and [●] ("Indemnitee").

WHEREAS, in light of the litigation costs and risks to directors and officers resulting from their service to companies, and the desire of the PQ Companies to attract and retain qualified individuals to serve as directors and officers, it is reasonable, prudent and necessary for each of the PQ Companies to indemnify and advance expenses on behalf of its and the other PQ Companies' directors and officers to the fullest extent permitted under Applicable Law so that they will serve or continue to serve the PQ Companies free from undue concern regarding such risks;

WHEREAS, the PQ Companies have requested that Indemnitee serve or continue to serve as a director and/or an officer of one or more of the PQ Companies and may have requested or may in the future request that Indemnitee serve one or more PQ Entities (as hereinafter defined) as a director or an officer or in other capacities;

WHEREAS, one of the conditions that Indemnitee requires in order to serve as a director and/or an officer of one or more of the PQ Companies is that Indemnitee be so indemnified; and

WHEREAS, Indemnitee may have certain rights to indemnification, advancement of expenses and/or insurance provided by one or more of the Designating Stockholders (as hereinafter defined) (or their affiliates) and/or any insurer providing insurance coverage under any policy purchased or maintained by such Designating Stockholders (or their affiliates), which Indemnitee, the PQ Companies and the Designating Stockholders (or their affiliates) intend to be secondary to the primary obligation of the PQ Companies to indemnify Indemnitee as provided herein, with the PQ Companies' acknowledgement of and agreement to the foregoing being a material condition to Indemnitee's willingness to serve as a director and/or officer of one or more of the PQ Companies.

NOW, THEREFORE, in consideration of the premises and the covenants contained herein, the PQ Companies and Indemnitee do hereby covenant and agree as follows:

1. Services by Indemnitee. Indemnitee agrees to serve as a director and/or an officer of one or more of the PQ Companies. Indemnitee may at any time and for any reason resign from such position (subject to any contractual obligation the Indemnitee may have under any other agreement).
2. Indemnification — General. On the terms and subject to the conditions of this Agreement, the PQ Companies shall, to the fullest extent permitted under Applicable Law,

indemnify Indemnitee with respect to, and hold Indemnitee harmless from and against, all losses, damages, liabilities, judgments, fines, penalties, costs, amounts paid in settlement, Expenses (as hereinafter defined) and other amounts that Indemnitee reasonably incurs and that result from, arise in connection with or are by reason of Indemnitee's Corporate Status (as hereinafter defined), including all interest, assessments and other charges paid or payable in connection therewith, and shall advance Expenses to Indemnitee. The obligations of the PQ Companies under this Agreement (a) are joint and several obligations of each PQ Company, (b) shall continue after such time as Indemnitee ceases to serve as a director or an officer of the PQ Companies or in any other Corporate Status and (c) include, without limitation, claims for monetary damages against Indemnitee in respect of any actual or alleged liability or other loss of Indemnitee, to the fullest extent permitted under Applicable Law. A limitation under law of any PQ Company on providing indemnification or an advance of expenses to Indemnitee shall not limit the indemnification and advancement obligations of any PQ Company not so limited.

3. Proceedings Other Than Proceedings by or in the Right of the PQ Companies. If in connection with or by reason of Indemnitee's Corporate Status, Indemnitee was, is, or is threatened to be made, a party to or a participant in any Proceeding (as hereinafter defined) other than a Proceeding by or in the right of any of the PQ Companies to procure a judgment in its favor, the PQ Companies shall, to the fullest extent permitted under Applicable Law, indemnify Indemnitee with respect to, and hold Indemnitee harmless from and against, all losses, damages, liabilities, judgments, fines, penalties, costs, amounts paid in settlement, Expenses and other amounts that Indemnitee reasonably incurs in connection with such Proceeding or any claim, issue or matter therein, including all interest, assessments and other charges paid or payable in connection therewith.

4. Proceedings by or in the Right of the PQ Companies. If in connection with or by reason of Indemnitee's Corporate Status, Indemnitee was, is, or is threatened to be made, a party to or a participant in any Proceeding by or in the right of any of the PQ Companies to procure a judgment in such PQ Company's favor, the PQ Companies shall, to the fullest extent permitted under Applicable Law, indemnify Indemnitee with respect to, and hold Indemnitee harmless from and against, all Expenses reasonably incurred by Indemnitee or on behalf of Indemnitee in connection with such Proceeding or any claim, issue or matter therein.

5. Mandatory Indemnification in Case of Successful Defense. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee is, by reason of Indemnitee's Corporate Status, a party to (or a participant in) and is successful, on the merits or otherwise, in defense of any Proceeding (including, without limitation, any Proceeding brought by or in the right of any PQ Company), the PQ Companies shall, to the fullest extent permitted under Applicable Law, indemnify Indemnitee with respect to, and hold Indemnitee harmless from and against, all Expenses reasonably incurred by Indemnitee or on behalf of Indemnitee in connection therewith. If Indemnitee is not wholly successful in defense of such Proceeding but is successful, on the merits or otherwise, as to one or more but less than all claims, issues or matters in such Proceeding, the PQ Companies shall, to the fullest extent permitted under Applicable Law, indemnify Indemnitee against all Expenses reasonably incurred by Indemnitee or on behalf of Indemnitee in connection with each successfully resolved claim, issue or matter. For purposes of this Section 5 and without limitation, the termination of any claim, issue or matter in such a Proceeding by dismissal, with or without prejudice, on substantive or procedural

grounds, or settlement of any such claim prior to a final judgment by a court of competent jurisdiction with respect to such Proceeding, shall be deemed to be a successful result as to such claim, issue or matter; provided, however, that any settlement of any claim, issue or matter in such a Proceeding shall not be deemed to be a successful result as to such claim, issue or matter if such settlement is effected by Indemnitee without the PQ Companies' prior written consent, which consent shall not be unreasonably withheld, delayed or conditioned.

6. Partial Indemnification. If Indemnitee is entitled under any provision of this Agreement or otherwise to indemnification by any of the PQ Companies for some or a portion of the losses, damages, liabilities, judgments, fines, penalties, costs, amounts paid in settlement, and Expenses, including all interest, assessments and other charges paid or payable in connection therewith, incurred by Indemnitee or on behalf of Indemnitee in connection with a Proceeding or any claim, issue or matter therein, in whole or in part, the PQ Companies shall, to the fullest extent permitted under Applicable Law, indemnify Indemnitee to the fullest extent to which Indemnitee is entitled to such indemnification.

7. Indemnification for Additional Expenses Incurred to Secure Recovery or as Witness

(a) The PQ Companies shall, to the fullest extent permitted under Applicable Law, indemnify Indemnitee with respect to, and hold Indemnitee harmless from and against, any and all Expenses and, if requested by Indemnitee, shall advance on an as-incurred basis (as provided in Section 8 of this Agreement) such Expenses to Indemnitee, which are incurred by Indemnitee in connection with any action or proceeding or part thereof brought by Indemnitee for (i) indemnification or advance payment of Expenses by the PQ Companies under this Agreement, any other agreement, the Certificate of Incorporation, By-laws, limited liability company agreement or other governing document of the applicable PQ Company as now or hereafter in effect; or (ii) recovery under any director and officer liability insurance policy maintained by any PQ Entity.

(b) To the extent that Indemnitee is, by reason of Indemnitee's Corporate Status, a witness (or is forced or asked to respond to discovery requests) in any Proceeding to which Indemnitee is not a party, the PQ Companies shall, to the fullest extent permitted under Applicable Law, indemnify Indemnitee with respect to, and hold Indemnitee harmless from and against, and the PQ Companies shall advance on an as-incurred basis (as provided in Section 8 of this Agreement), all Expenses reasonably incurred by Indemnitee or on behalf of Indemnitee in connection therewith.

8. Advancement of Expenses. The PQ Companies shall, to the fullest extent permitted under Applicable Law, pay on a current and as-incurred basis all Expenses incurred by Indemnitee in connection with any Proceeding in any way connected with, resulting from or relating to Indemnitee's Corporate Status. Such Expenses shall be paid in advance of the final disposition of such Proceeding, without regard to whether Indemnitee will ultimately be entitled to be indemnified for such Expenses and without regard to whether an Adverse Determination (as hereinafter defined) has been or may be made. Upon submission of a request for advancement of Expenses pursuant to Section 9(c) of this Agreement, Indemnitee shall be entitled to advancement of Expenses as provided in this Section 8, and such advancement of

Expenses shall continue until such time (if any) as there is a final non-appealable judicial determination that Indemnitee is not entitled to indemnification. Indemnitee shall repay such amounts advanced if and to the extent that it shall ultimately be determined in a decision by a court of competent jurisdiction from which no appeal can be taken that Indemnitee is not entitled to be indemnified by the PQ Companies for such Expenses. Such repayment obligation shall be unsecured and shall not bear interest. The PQ Companies shall not impose on Indemnitee additional conditions to advancement or require from Indemnitee additional undertakings regarding repayment. Indemnitee shall, in all events, be entitled to advancement of Expenses, without regard to Indemnitee's ultimate entitlement to indemnification, until the final determination of the Proceeding.

9. Indemnification Procedures.

(a) Notice of Proceeding. Indemnitee agrees to notify the PQ Companies promptly upon being served with any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter which may be subject to indemnification or advancement of Expenses hereunder. Any failure by Indemnitee to notify any PQ Company will not relieve the PQ Companies of their advancement or indemnification obligations under this Agreement unless, and only to the extent that, the PQ Companies can establish that such omission to notify resulted in actual and material prejudice to them, which prejudice cannot be reversed or otherwise eliminated without any material negative effect on the PQ Companies, and the omission to notify the PQ Companies will, in any event, not relieve any PQ Company from any liability which it may have to indemnify Indemnitee otherwise than under this Agreement. If, at the time of receipt of any such notice, the PQ Companies have director and officer liability insurance policies in effect, the PQ Companies will promptly notify the relevant insurers in accordance with the procedures and requirements of such policies.

(b) Defense; Settlement. Indemnitee shall have the sole right and obligation to control the defense or conduct of any claim or Proceeding with respect to Indemnitee. The PQ Companies shall not, without the prior written consent of Indemnitee, which may be provided or withheld in Indemnitee's sole discretion, effect any settlement of any Proceeding against Indemnitee or which, in the reasonable opinion of Independent Counsel (as hereinafter defined), could have been brought against Indemnitee or which potentially or actually imposes any cost, liability, exposure or burden on Indemnitee unless (i) such settlement solely involves the payment of money or performance of any obligation by persons other than Indemnitee and includes an unconditional, full release of Indemnitee by all relevant parties from all liability on any matters that are the subject of such Proceeding and an acknowledgment that Indemnitee denies all wrongdoing in connection with such matters and (ii) the PQ Companies have fully indemnified the Indemnitee with respect to, and held Indemnitee harmless from and against, all Expenses and other amounts incurred by Indemnitee or on behalf of Indemnitee in connection with such Proceeding. The PQ Companies shall not be obligated to indemnify Indemnitee against amounts paid in settlement of a Proceeding against Indemnitee if such settlement is effected by Indemnitee without the PQ Companies' prior written consent, which consent shall not be unreasonably withheld, delayed or conditioned, unless such settlement solely involves the payment of money or performance of any obligation by persons other than the PQ Companies and includes an unconditional release of the PQ Companies by any party to such Proceeding other than the Indemnitee from all liability on any matters that are the subject of such Proceeding and an acknowledgment that the PQ Companies deny all wrongdoing in connection with such matters.

(c) Request for Advancement; Request for Indemnification.

(i) To obtain advancement of Expenses under this Agreement, Indemnitee shall submit to the PQ Companies a written request therefor, together with such invoices or other supporting information as may be reasonably requested by the PQ Companies and reasonably available to Indemnitee, and an unsecured written undertaking to repay amounts advanced only to the extent that it is ultimately determined that Indemnitee is not entitled to be indemnified by any of the PQ Companies. The PQ Companies shall make advance payment of Expenses to Indemnitee no later than five (5) business days after receipt of the written request for advancement (and each subsequent request for advancement) by Indemnitee. If, at the time of receipt of any such written request for advancement of Expenses, the PQ Companies have director and officer insurance policies in effect, the PQ Companies shall promptly notify the relevant insurers in accordance with the procedures and requirements of such policies. The PQ Companies shall thereafter keep such director and officer insurers informed of the status of the Proceeding or other claim (with assistance from the Indemnitee as reasonably required) and take such other actions, as appropriate to secure coverage of Indemnitee for such claim.

(ii) To obtain indemnification under this Agreement, at any time before or after submission of a request for advancement pursuant to Section 9(c)(i) of this Agreement, Indemnitee may submit a written request for indemnification hereunder. The time at which Indemnitee submits a written request for indemnification shall be determined by the Indemnitee in the Indemnitee's sole discretion. Once Indemnitee submits such a written request for indemnification (and only at such time that Indemnitee submits such a written request for indemnification), a Determination (as hereinafter defined) shall thereafter be made, as provided in and only to the extent required by Section 9(d) of this Agreement. In no event shall a Determination be made, or required to be made, as a condition to or otherwise in connection with any advancement of Expenses pursuant to Section 8 and Section 9(c)(i) of this Agreement. If, at the time of receipt of any such request for indemnification, the PQ Companies have director and officer insurance policies in effect, the PQ Companies shall promptly notify the relevant insurers and take such other actions as necessary or appropriate to secure coverage of Indemnitee for such claim in accordance with the procedures and requirements of such policies.

(d) Determination. The PQ Companies agree that Indemnitee shall be indemnified to the fullest extent permitted under Applicable Law and that no Determination shall be required in connection with such indemnification unless specifically required by Applicable Law which cannot be waived. In no event shall a Determination be required in connection with indemnification for Expenses pursuant to Section 7 of this Agreement or incurred in connection with any Proceeding or portion thereof with respect to which Indemnitee has been successful on the merits or otherwise. Any decision that a Determination is required by Applicable Law in connection with any other indemnification of Indemnitee, and any such Determination, shall be made within twenty (20) days after receipt of Indemnitee's written request for indemnification pursuant to Section 9(c)(ii) of this Agreement and such Determination shall be made either (i) by the Disinterested Directors (as

hereinafter defined), even though less than a quorum, so long as Indemnitee does not request that such Determination be made by Independent Counsel (as hereinafter defined), or (ii) if so requested by Indemnitee, in Indemnitee's sole discretion, by Independent Counsel in a written opinion to the PQ Companies and Indemnitee. If a Determination is made that Indemnitee is entitled to indemnification, payment to Indemnitee shall be made within five (5) business days after such Determination. Indemnitee shall reasonably cooperate with the person, persons or entity making such determination with respect to Indemnitee's entitlement to indemnification, including providing to such person, persons or entity upon reasonable advance request any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to Indemnitee and reasonably necessary to such Determination. Any Expenses incurred by Indemnitee in so cooperating with the Disinterested Directors or Independent Counsel, as the case may be, making such determination shall be advanced and borne by the PQ Companies (irrespective of the Determination as to Indemnitee's entitlement to indemnification) and each PQ Company is liable to indemnify and hold Indemnitee harmless therefrom. If the person, persons or entity empowered or selected under this Section 9(d) to determine whether Indemnitee is entitled to indemnification shall not have made a determination within twenty (20) days after receipt by the PQ Companies of the request therefor, the requisite determination of entitlement to indemnification shall, to the fullest extent not prohibited by Applicable Law, be deemed to have been made and Indemnitee shall be entitled to such indemnification, absent (i) a misstatement by Indemnitee of a material fact or an omission of a material fact necessary to make Indemnitee's statement not materially misleading in connection with the request for indemnification that actually prejudices the PQ Companies, or (ii) a prohibition of such indemnification under Applicable Law; provided, however, that such twenty (20) day period may be extended for a reasonable time, not to exceed an additional twenty (20) days, if the person, persons or entity making the determination with respect to entitlement to indemnification in good faith requires such additional time for the obtaining or evaluating of documentation and/or information relating thereto; and provided, further, that the foregoing provisions of this Section 9(d) shall not apply if the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to Section 9(e) of this Agreement.

(e) Independent Counsel. In the event Indemnitee requests that the Determination be made by Independent Counsel pursuant to Section 9(d) of this Agreement, the Independent Counsel shall be selected as provided in this Section 9(e). The Independent Counsel shall be selected by Indemnitee (unless Indemnitee shall request that such selection be made by the Board of Directors, in which event the Board of Directors shall make such selection on behalf of the PQ Companies, subject to the remaining provisions of this Section 9(e)), and Indemnitee or the PQ Companies, as the case may be, shall give written notice to the other, advising the PQ Companies or Indemnitee of the identity of the Independent Counsel so selected. The PQ Companies or Indemnitee, as the case may be, may, within five (5) days after such written notice of selection shall have been received, deliver to Indemnitee or the PQ Companies, as the case may be, a written objection to such selection; provided, however, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of "Independent Counsel" as defined in Section 15 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If a written objection is so made and substantiated, the Independent Counsel so selected may not serve as Independent Counsel unless and until such objection is withdrawn or a court of competent

jurisdiction has determined that such objection is without merit. If, within ten (10) days after submission by Indemnitee of a written request for indemnification pursuant to Section 9(c)(ii) of this Agreement and after a request for the appointment of Independent Counsel has been made, no Independent Counsel shall have been selected and not objected to, either the PQ Companies or Indemnitee may petition a court of competent jurisdiction for resolution of any objection which shall have been made by the PQ Companies or Indemnitee to the other's selection of Independent Counsel and/or for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate, and the person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 9(d) of this Agreement. Upon the due commencement of any judicial proceeding or arbitration pursuant to Section 9(f) of this Agreement, Independent Counsel shall be discharged and relieved of any further responsibility in such capacity (subject to the applicable standards of professional conduct then prevailing). Any expenses incurred by or in connection with the appointment of Independent Counsel shall be borne by the PQ Companies (irrespective of the Determination of Indemnitee's entitlement to indemnification) and not by Indemnitee.

(f) Consequences of Determination; Remedies of Indemnitee The PQ Companies shall be bound by and shall have no right to challenge a Favorable Determination. If an Adverse Determination is made, or if for any other reason the PQ Companies do not make timely indemnification payments or advances of Expenses, Indemnitee shall have the right to commence a Proceeding before a court of competent jurisdiction to challenge such Adverse Determination and/or to require the PQ Companies to make such payments or advances (and the Company shall have the right to defend its position in such Proceeding and to appeal any adverse judgment in such Proceeding). Indemnitee shall be entitled to be indemnified for all Expenses incurred in connection with such a Proceeding and to have such Expenses advanced by the Company in accordance with Section 8 of this Agreement. If Indemnitee fails to challenge an Adverse Determination within twenty (20) business days, or if Indemnitee challenges an Adverse Determination and such Adverse Determination has been upheld by a final judgment of a court of competent jurisdiction from which no appeal can be taken, then, to the extent and only to the extent required by such Adverse Determination or final judgment, the PQ Companies shall not be obligated to indemnify Indemnitee under this Agreement.

(g) Presumptions; Burden and Standard of Proof The parties intend and agree that, to the extent permitted under Applicable Law, in connection with any Determination with respect to Indemnitee's entitlement to indemnification hereunder by any person, including a court:

(i) it will be presumed that Indemnitee is entitled to indemnification under this Agreement (notwithstanding any Adverse Determination), and the PQ Entities or any other person or entity challenging such right will have the burden of proof to overcome that presumption in connection with the making by any person, persons or entity of any determination contrary to that presumption;

(ii) the termination of any action, suit or proceeding by judgment, order, settlement, conviction, or upon a plea of *nolo contendere* or its equivalent, shall not, of itself, create a presumption that Indemnitee did not act in good faith and in a manner which Indemnitee reasonably believed to be in or not opposed to the best interests of the applicable PQ Entity, and, with respect to any criminal action or proceeding, had reasonable cause to believe that Indemnitee's conduct was unlawful;

(iii) Indemnitee will be deemed to have acted in good faith if Indemnitee's action is based on the records or books of account of the applicable PQ Entity, including financial statements, or on information supplied to Indemnitee by the officers, employees or committees of the board of directors of the applicable PQ Entity, or on the advice of legal counsel or other advisors (including financial advisors and accountants) for the applicable PQ Entity or on information or records given in reports made to the applicable PQ Entity by an independent certified public accountant or by an appraiser or other expert or advisor selected by the applicable PQ Entity; and

(iv) the knowledge and/or actions, or failure to act, of any director, officer, agent or employee of any of the PQ Entities or relevant enterprises will not be imputed to Indemnitee in a manner that limits or otherwise adversely affects Indemnitee's rights hereunder.

The provisions of this Section 9(g) shall not be deemed to be exclusive or to limit in any way the other circumstances in which Indemnitee may be deemed to have met the applicable standard of conduct set forth in this Agreement.

10. Remedies of Indemnitee.

(a) In the event that (i) a determination is made pursuant to Section 9(d) of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 8 and Section 9(c)(i) of this Agreement, (iii) no determination of entitlement to indemnification shall have been made pursuant to Section 9(d) of this Agreement within twenty (20) days after receipt by the PQ Companies of the request for indemnification, (iv) payment of indemnification is not made pursuant to Section 5, 6 or 7 of this Agreement within five (5) business days after receipt by the PQ Companies of a written request therefor, (v) payment of indemnification pursuant to Section 3, 4 or 7 of this Agreement is not made within five (5) business days after a determination has been made that Indemnitee is entitled to indemnification or (vi) the PQ Companies or any other person takes or threatens to take any action to declare this Agreement void or unenforceable, or institutes any litigation or other action or Proceeding designed to deny, or to recover from, the Indemnitee the benefits provided or intended to be provided to the Indemnitee hereunder, Indemnitee shall be entitled to an adjudication by a court of his entitlement to such indemnification or advancement of Expenses. Alternatively, Indemnitee, at his option, may seek an award in arbitration to be conducted by a single arbitrator pursuant to the Commercial Arbitration Rules of the American Arbitration Association. The PQ Companies shall not oppose Indemnitee's right to seek any such adjudication or award in arbitration.

(b) In the event that a determination shall have been made pursuant to Section 9(d) of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding or arbitration commenced pursuant to this Section 10 shall be conducted in all respects as a de novo trial, or arbitration, on the merits, in which (i) Indemnitee shall not be prejudiced by reason of that adverse determination, and (ii) the PQ Companies shall bear the burden of establishing that Indemnitee is not entitled to indemnification.

(c) If a determination shall have been made pursuant to Section 9(d) of this Agreement that Indemnitee is entitled to indemnification, the PQ Companies shall be bound by such determination in any judicial proceeding or arbitration commenced pursuant to this Section 10, absent (i) a misstatement by Indemnitee of a material fact or an omission of a material fact necessary to make Indemnitee's statement not materially misleading in connection with the request for indemnification that actually prejudices the PQ Companies, or (ii) a prohibition of such indemnification under Applicable Law.

(d) The PQ Companies shall, to the fullest extent not prohibited by Applicable Law, be precluded from asserting in any judicial proceeding or arbitration commenced pursuant to this Section 10 that the procedures and presumptions of this Agreement are not valid, binding and enforceable and shall stipulate in any such court or before any such arbitrator that the PQ Companies are bound by all the provisions of this Agreement.

11. Insurance; Subrogation; Other Rights of Recovery, etc.

(a) Each PQ Company shall use its reasonable best efforts to purchase and maintain a policy or policies of insurance with reputable insurance companies with A.M. Best ratings of "A" or better, providing Indemnitee with coverage for any liability asserted against, and incurred by, Indemnitee or on Indemnitee's behalf by reason of Indemnitee's Corporate Status, or arising out of Indemnitee's status as such, whether or not any such PQ Company would have the power to indemnify Indemnitee against such liability. Such insurance policies shall have coverage terms and policy limits at least as favorable to Indemnitee as the insurance coverage provided to any other director or officer of the PQ Companies. If any PQ Company has such insurance in effect at the time it receives from Indemnitee any notice of the commencement of an action, suit, proceeding or other claim, such PQ Company shall give prompt notice of the commencement of such action, suit, proceeding or other claim to the insurers and take such other actions in accordance with the procedures set forth in the policy as required or appropriate to secure coverage of Indemnitee for such action, suit, proceeding or other claim. Such PQ Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such action, suit, proceeding or other claim in accordance with the terms of such policy. Such PQ Company shall continue to provide such insurance coverage to Indemnitee for a period of at least ten (10) years after Indemnitee ceases to serve as a director or an officer or in any other Corporate Status.

(b) In the event of any payment by any PQ Company under this Agreement, such PQ Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee against any other PQ Entity, and Indemnitee hereby agrees, as a condition to obtaining any advancement or indemnification from the PQ Companies, to assign to such PQ Company all of Indemnitee's rights to obtain from such other PQ Entity such amounts to the extent that they have been paid by such PQ Company to or for the benefit of Indemnitee as advancement or indemnification under this Agreement and are adequate to indemnify Indemnitee with respect to the costs, Expenses or other items to the full extent that Indemnitee is entitled to indemnification or other payment hereunder; and Indemnitee will (upon request by the PQ Companies) execute all papers required and use reasonable best efforts to take all action reasonably necessary to secure such rights, including execution of such documents as are necessary to enable such PQ Company to bring suit or enforce such rights.

(c) Each of the PQ Companies hereby unconditionally and irrevocably waives, relinquishes and releases, and covenants and agrees not to exercise (and to cause each of the other PQ Entities not to exercise), any rights that such PQ Company may now have or hereafter acquire against any Designating Stockholder (or former Designating Stockholder), insurer of such Designating Stockholder (or former Designating Stockholder) or Indemnitee that arise from or relate to the existence, payment, performance or enforcement of the PQ Companies' obligations under this Agreement or under any other indemnification agreement (whether pursuant to contract, by-laws or charter) with any person or entity, including, without limitation, any right of subrogation (whether pursuant to contract or common law), reimbursement, exoneration, contribution or indemnification, or to be held harmless, and any right to participate in any claim or remedy of Indemnitee against any Designating Stockholder (or former Designating Stockholder) or Indemnitee, whether or not such claim, remedy or right arises in equity or under contract, statute or common law, including, without limitation, the right to take or receive from any Designating Stockholder (or former Designating Stockholder), insurer of such Designating Stockholder (or former Designating Stockholder) or Indemnitee, directly or indirectly, in cash or other property or by set-off or in any other manner, payment or security on account of such claim, remedy or right.

(d) The PQ Companies shall not be liable to pay or advance to Indemnitee any amounts otherwise indemnifiable under this Agreement or under any other indemnification agreement if, and to the extent that, Indemnitee has otherwise actually received such payment under any insurance policy, contract, agreement or otherwise; provided, however, that (i) the PQ Companies hereby agree that they are the indemnitors of first resort under this Agreement and under any other indemnification agreement (i.e., their obligations to Indemnitee under this Agreement or any other agreement or undertaking to provide advancement and/or indemnification to Indemnitee are primary and any obligation of any Designating Stockholder (or any affiliate thereof other than any PQ Entity) and/or any obligation of any insurer providing insurance coverage under any policy purchased or maintained by such Designating Stockholders (or by any affiliate thereof, other than any PQ Entity) to provide advancement or indemnification for the same Expenses, liabilities, judgments, penalties, fines and amounts paid in settlement (including all interest, assessments and other charges paid or payable in connection with or in respect of such Expenses, liabilities, judgments, penalties, fines and amounts paid in settlement) incurred by Indemnitee are secondary, (ii) the PQ Companies shall be required to advance the full amount of expenses incurred by any such Indemnitee and shall be liable for the full amount of all liability and loss suffered by such Indemnitee (including, but not limited to, Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by such Indemnitee in connection with such Proceeding), without regard to any rights any such Indemnitee may have against any Designating Stockholder or against any insurance carrier providing insurance coverage to Indemnitee under any insurance policy issued to a Designating Stockholder and (iii) if any Designating Stockholder (or any affiliate thereof other than any PQ Entity) pays or causes to be paid, for any reason, any amounts otherwise indemnifiable hereunder or under any other indemnification agreement (whether pursuant to contract, by-laws or charter) with Indemnitee, then (x) such Designating Stockholder (or such affiliate, as the case may be) shall be fully subrogated to all rights of Indemnitee with respect to such payment and (y) the PQ Companies shall fully indemnify, reimburse and hold harmless such Designating Stockholder (or such other affiliate) for all such payments actually made by such Designating Stockholder (or such other affiliate).

(e) The PQ Companies' obligation to indemnify or advance Expenses hereunder to Indemnitee in respect of or relating to Indemnitee's service at the request of any of the PQ Companies as a director, officer, employee, fiduciary, trustee, representative, partner or agent of any other PQ Entity shall be reduced by any amount Indemnitee has actually received as payment of indemnification or advancement of Expenses from such other PQ Entity, except to the extent that such indemnification payments and advance payment of Expenses when taken together with any such amount actually received from other PQ Entities or under director and officer insurance policies maintained by one or more PQ Entities are inadequate to fully pay all costs, Expenses or other items to the full extent that Indemnitee is otherwise entitled to indemnification or other payment hereunder.

(f) Except as provided in Sections 11(c), 11(d) and 11(e) of this Agreement, the rights to indemnification and advancement of Expenses as provided by this Agreement shall not be deemed exclusive of, and shall be considered supplemental to, any other rights to which Indemnitee may at any time, whenever conferred or arising, be entitled under Applicable Law, under the PQ Entities' Certificates of Incorporation or By-Laws, or under any other agreement, vote of stockholders or resolution of directors of any PQ Entity, or otherwise. Indemnitee's rights under this Agreement are present contractual rights that fully vest upon Indemnitee's first service as a director or an officer of any of the PQ Companies. The Parties hereby agree that Sections 11(c), 11(d) and 11(e) of this Agreement shall be deemed exclusive and shall be deemed to modify, amend and clarify any right to indemnification or advancement provided to Indemnitee under any other contract, agreement or document with any PQ Entity.

(g) No amendment, alteration or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in Indemnitee's Corporate Status prior to such amendment, alteration or repeal. To the extent that a change in the General Corporation Law of the State of Delaware (or other Applicable Law), whether by statute or judicial decision, permits greater indemnification or advancement of Expenses than would be afforded currently under the PQ Entities' Certificates of Incorporation or By-Laws and this Agreement, it is the intent of the parties hereto that Indemnitee enjoy by this Agreement the greater benefits so afforded by such change. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

12. Employment Rights: Successors: Third Party Beneficiaries.

(a) This Agreement shall not be deemed an employment contract between the PQ Companies and Indemnitee. This Agreement shall continue in force as provided above after Indemnitee has ceased to serve as a director or an officer of the PQ Companies or any other Corporate Status.

(b) This Agreement shall be binding upon each of the PQ Companies and their successors and assigns and shall inure to the benefit of Indemnitee and Indemnitee's heirs, executors and administrators. If any of the PQ Companies or any of their respective successors

or assigns shall (i) consolidate with or merge into any other corporation or entity and shall not be the continuing or surviving corporation or entity of such consolidation or merger or (ii) transfer all or substantially all of its properties and assets to any individual, corporation or other entity, then, and in each such case, proper provisions shall be made so that the successors and assigns of the PQ Companies shall assume all of the obligations set forth in this Agreement.

(c) The Designating Stockholders are express third party beneficiaries of this Agreement, are entitled to rely upon this Agreement, and may specifically enforce the PQ Companies' obligations hereunder (including but not limited to the obligations specified in Section 11 of this Agreement) as though a party hereunder.

13. Severability. If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable for any reason whatsoever: (i) the validity, legality and enforceability of the remaining provisions of this Agreement (including without limitation, each portion of any Section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby; (ii) such provision or provisions shall be deemed reformed to the extent necessary to conform to Applicable Law and to give the maximum effect to the intent of the parties hereto; and (iii) to the fullest extent possible, the provisions of this Agreement (including, without limitation, each portion of any Section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall be construed so as to give effect to the intent manifested thereby.

14. Exception to Right of Indemnification or Advancement of Expenses. Notwithstanding any other provision of this Agreement and except as provided in Section 7(a) of this Agreement or as may otherwise be agreed by any PQ Company, Indemnitee shall not be entitled to indemnification or advancement of Expenses under this Agreement with respect to any Proceeding brought by Indemnitee (other than a Proceeding by Indemnitee (i) by way of defense or counterclaim or other similar portion of a Proceeding, (ii) to enforce Indemnitee's rights under this Agreement or (iii) to enforce any other rights of Indemnitee to indemnification, advancement or contribution from the PQ Companies under any other contract, by-laws or charter or under statute or other law, including any rights under Section 145 of the Delaware General Corporation Law), unless the bringing of such Proceeding or making of such claim shall have been approved by the board of directors of the applicable PQ Company.

15. Definitions. For purposes of this Agreement:

(a) "Applicable Law" means, as applied to each PQ Company, any law applicable to such PQ Company as in existence on the date hereof and as amended from time to time; provided, however, that under all circumstances Applicable Law shall be construed assuming that Indemnitee is a director or officer of the indemnifying corporation for purposes of determining the availability and scope of any indemnification right afforded to Indemnitee under this Agreement; provided, further, that as applied to each of Opco and Potters, Applicable Law shall be construed to treat Section 145 of the Delaware General Corporation Law (as in existence on the date hereof and as amended from time to time, including any successor provision thereto) as if it was applicable to each of Opco and Potters.

(b) “Board of Directors” means the board of directors of the Company.

(c) “By-laws” means, in each case, the bylaws or similar governing document of the relevant company as amended from time to time.

(d) [“CCMP Entities” means investment funds affiliated with CCMP Capital Advisors, LP, including CCMP Capital Investors III, L.P., CCMP Capital Investors III (Employee), L.P., CCMP Capital Investors III (AV-7), L.P., CCMP Capital Investors III (AV-8), L.P., CCMP Capital Investors III (AV-9), L.P., CCMP Capital Investors III (AV-10), L.P. and Quartz Co-Invest, L.P., and any related investment adviser or management company, any investment fund, managing member or general partner that is an affiliate of any of the foregoing entities (other than any PQ Entity) or that is advised by the same investment adviser as any of the foregoing entities or by an affiliate of such investment adviser.]

(e) “Certificate of Incorporation” means, in each case, the certificate of incorporation, articles of incorporation or similar constituting document of the relevant company as amended from time to time.

(f) “Corporate Status” describes the status of a person by reason of such person’s past, present or future service as a director, officer, employee, fiduciary, trustee, or agent of any of the PQ Companies (including, without limitation, one who serves at the request of any of the PQ Companies as a director, officer, employee, fiduciary, trustee or agent of any other PQ Entity).

(g) “Designating Stockholder” means any of the [CCMP Entities / INEOS Entities], in each case so long as an individual designated (directly or indirectly) by the [CCMP Entities / INEOS Entities] or any of their respective affiliates serves or has served as a director and/or officer of any PQ Entity.

(h) “Determination” means a determination that either (i) there is a reasonable basis for the conclusion that indemnification of Indemnitee is proper in the circumstances because Indemnitee met a/the particular standard(s) of conduct (a “Favorable Determination”) or (ii) there is no reasonable basis for the conclusion that indemnification of Indemnitee is proper in the circumstances because Indemnitee met a/the particular standard(s) of conduct (an “Adverse Determination”). An Adverse Determination shall include the decision that a Determination was required in connection with indemnification and the decision as to the applicable standard of conduct.

(i) “Disinterested Director” means a director of the Company (or, if a Determination is necessary with respect to a PQ Company other than the Company, a director of such PQ Company) who is not and was not a party to the Proceeding in respect of which indemnification is sought by Indemnitee and does not otherwise have an interest materially adverse to any interest of the Indemnitee.

(j) “Expenses” shall mean all direct and indirect costs, fees and expenses of any type or nature whatsoever and shall specifically include, without limitation, all reasonable attorneys’ fees, retainers, court costs, transcript costs, fees and costs of experts, witness fees and costs,

travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, any federal, state, local or foreign taxes imposed on Indemnitee as a result of the actual or deemed receipt of any payments under this Agreement, ERISA excise taxes and penalties, and all other disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness, in, or otherwise participating in, a Proceeding or an appeal resulting from a Proceeding, including, but not limited to, the premium for appeal bonds, attachment bonds or similar bonds and all interest, assessments and other charges paid or payable in connection with or in respect of any such Expenses, and shall also specifically include, without limitation, all reasonable attorneys' fees and all other expenses incurred by or on behalf of Indemnitee in connection with preparing and submitting any requests or statements for indemnification, advancement, contribution or any other right provided by this Agreement. Expenses, however, shall not include amounts of judgments or fines against Indemnitee.

(k) "Independent Counsel" means, at any time, any law firm, or a member of a law firm, that (a) is experienced in matters of corporation law and (b) is not, at such time, or has not been in the five years prior to such time, retained to represent: (i) any PQ Entity or Indemnitee in any matter material to either such party (other than with respect to matters concerning Indemnitee under this Agreement, or of other indemnities under similar indemnification agreements), or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term "Independent Counsel" shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the PQ Companies or Indemnitee in an action to determine Indemnitee's rights under this Agreement. The PQ Companies agree to pay the reasonable fees and expenses of the Independent Counsel referred to above and to fully indemnify such counsel against any and all Expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto and to be jointly and severally liable therefor.

(l) ["INEOS Entities" means INEOS Investments Partnership and its respective successors and affiliates (other than any PQ Entity).]

(m) "PQ Entity" means any PQ Company, any of their respective subsidiaries and any other corporation, partnership, limited liability company, joint venture, trust, employee benefit plan or other enterprise with respect to which Indemnitee serves as a director, officer, employee, partner, representative, fiduciary, trustee or agent, or in any similar capacity, at the request of any PQ Company.

(n) "Proceeding" includes any actual, threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation (formal or informal), inquiry, administrative hearing or any other actual, threatened, pending or completed proceeding, whether brought by or in the right of any PQ Company or otherwise and whether civil, criminal, administrative or investigative in nature, in which Indemnitee was, is, may be or will be involved as a party, witness or otherwise, by reason of Indemnitee's Corporate Status or by reason of any action taken by Indemnitee or of any inaction on Indemnitee's part while acting as director, officer, employee, fiduciary, trustee or agent of any PQ Entity (in each case whether or not Indemnitee is acting or serving in any such capacity or has such status at the time any liability or

expense is incurred for which indemnification or advancement of Expenses can be provided under this Agreement). If Indemnitee believes in good faith that a given situation may lead to or culminate in the institution of a Proceeding, this shall be considered a Proceeding under this paragraph.

16. Construction. Whenever required by the context, as used in this Agreement the singular number shall include the plural, the plural shall include the singular, and all words herein in any gender shall be deemed to include (as appropriate) the masculine, feminine and neuter genders.

17. Reliance. The PQ Companies expressly confirm and agree that they have entered into this Agreement and assumed the obligations imposed on each of them hereby in order to induce Indemnitee to serve as a director and/or an officer of one or more of the PQ Companies, and the PQ Companies acknowledge that Indemnitee is relying upon this Agreement in serving as a director and/or an officer of one or more of the PQ Companies.

18. Modification and Waiver. No supplement, modification or amendment of this Agreement shall be binding unless executed in a writing identified as such by all of the parties hereto. Except as otherwise expressly provided herein, the rights of a party hereunder (including the right to enforce the obligations hereunder of the other parties) may be waived only with the written consent of such party, and no waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provisions hereof (whether or not similar) nor shall such waiver constitute a continuing waiver.

19. Notice Mechanics. All notices, requests, demands or other communications hereunder shall be in writing and shall be deemed to have been duly given if (i) delivered by hand and receipted for by the party to whom said notice or other communication shall have been directed, or (ii) mailed by certified or registered mail with postage prepaid, on the third business day after the date on which it is so mailed:

(a) If to Indemnitee to:

[●]

(b) If to any PQ Company, to:

c/o PQ Group Holdings Inc.
300 Lindenwood Drive
Valleybrooke Corporate Center
Malvern, Pennsylvania 19355
Attn: Joseph S. Koscinski

with a copy to: Ropes & Gray LLP
Prudential Tower, 800 Boylston Street
Boston, MA 02199-3600
Attn: Craig E. Marcus

or to such other address as may have been furnished (in the manner prescribed above) as follows: (a) in the case of a change in address for notices to Indemnitee, furnished by Indemnitee to the PQ Companies and (b) in the case of a change in address for notices to any PQ Company, furnished by the PQ Companies to Indemnitee.

20. Contribution. To the fullest extent permissible under Applicable Law, if the indemnification provided for in this Agreement is unavailable to Indemnitee for any reason whatsoever, the PQ Companies, in lieu of indemnifying Indemnitee, shall contribute to the amount incurred by Indemnitee, whether for judgments, fines, penalties, excise taxes, amounts paid or to be paid in settlement and/or for reasonably incurred Expenses, in connection with any claim relating to an indemnifiable event under this Agreement, in such proportion as is deemed fair and reasonable in light of all of the circumstances of such Proceeding in order to reflect (i) the relative benefits received by the PQ Companies and Indemnitee as a result of the event(s) and/or transaction(s) giving cause to such Proceeding; and/or (ii) the relative fault of the PQ Companies (and their other directors, officers, employees and agents) and Indemnitee in connection with such event(s) and/or transaction(s).

21. Governing Law; Submission to Jurisdiction; Appointment of Agent for Service of Process. This Agreement and the legal relations among the parties shall, to the fullest extent permitted under Applicable Law, be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of laws rules. The PQ Companies and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Court of Chancery of the State of Delaware (the "Delaware Court"), and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court, and (iv) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court has been brought in an improper or otherwise inconvenient forum.

22. Headings. The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.

23. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original but all of which together shall constitute one and the same Agreement.

[Remainder of Page Intentionally Blank]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the date first above written.

The Company:

PQ GROUP HOLDINGS INC.

By: _____
Name:
Title:

Intermediate Holdcos:

PQ HOLDINGS INC.

By: _____
Name:
Title:

CPQ MIDCO I CORPORATION

By: _____
Name:
Title:

Opc:

PQ CORPORATION

By: _____
Name:
Title:

Eco:

ECO SERVICES OPERATIONS CORP.

By: _____
Name:
Title:

Potters:

POTTERS INDUSTRIES, LLC

By: _____
Name:
Title:

Indemnitee:

Name: [●]

[Signature Page to Indemnification Agreement]

PQ GROUP HOLDINGS INC.

2017 OMNIBUS INCENTIVE PLAN

1. Purpose. The purpose of the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan is to further align the interests of Eligible Persons with those of the Company's stockholders by providing long-term cash and equity incentive compensation opportunities tied to the performance of the Company and/or its Common Stock. The Plan is intended to advance the interests of the Company and increase stockholder value by attracting, retaining and motivating key personnel upon whose judgment, initiative and effort the successful conduct of the Company's business is largely dependent.

2. Definitions. Wherever the following capitalized terms are used in the Plan, they shall have the meanings specified below:

"*Award*" means an award of Stock Options, Stock Appreciation Rights, a Restricted Stock Award, Restricted Stock Units, a Cash Award, a Performance Award or a Stock Award granted under the Plan.

"*Award Agreement*" means a notice or an agreement entered into between the Company and a Participant setting forth the terms and conditions of an Award granted to a Participant as provided in Section 15.2 hereof.

"*Beneficial Owner*" shall have the meaning ascribed to such term in Rule 13d-3 under the Exchange Act.

"*Board*" means the Board of Directors of the Company.

"*Cash Award*" means an Award denominated in cash that is granted to an Eligible Person under Section 10 hereof and subject to such conditions as are set forth in the Plan and the applicable Award Agreement.

"*Cause*" shall have the meaning set forth in Section 13.2 hereof.

"*Change in Control*" shall have the meaning set forth in Section 12.2 hereof.

"*Code*" means the Internal Revenue Code of 1986, as amended.

"*Committee*" means (i) the Compensation Committee of the Board, (ii) as provided in Section 3.1 hereof, such other committee of the Board appointed by the Board to administer the Plan, (iii) as provided in Section 3.1 hereof, the full Board, or (iv) as provided in Section 3.3 hereof, its delegates.

"*Common Stock*" means the Company's common stock, par value \$0.01 per share, as the same may be reclassified, exchanged or recapitalized.

"*Company*" means PQ Group Holdings Inc., a Delaware corporation or any successor thereto.

“*Date of Grant*” means the date on which an Award under the Plan is granted or approved for grant by the Committee or such later date as the Committee may specify to be the effective date of an Award.

“*Disability*” shall have the meaning set forth below, except with respect to any Participant who has an effective employment agreement or service agreement with the Company or one of its Subsidiaries that defines “Disability” or a like term, in which event the definition of “Disability” as set forth in such agreement shall be deemed to be the definition of “Disability” herein solely for such Participant and only for so long as such agreement remains effective. In all other events, the term “Disability” shall mean a Participant’s inability to perform the essential duties, responsibilities and functions of such Participant’s position with the Company and its Subsidiaries for a period of ninety (90) consecutive days or for a total of one hundred and eighty (180) days during any twelve (12)-month period as a result of any mental or physical illness, disability or incapacity even with reasonable accommodations for such illness, disability or incapacity provided by the Company and its Subsidiaries or if providing such accommodations would be unreasonable and which condition is expected to last for a continuous period of not less than twelve (12) months, all as determined by the Committee in its reasonable good faith judgment. A Participant shall cooperate in all respects with the Company if a question arises as to whether he or she has become disabled (including, without limitation, submitting to reasonable examinations by one or more medical doctors and other health care specialists selected by the Company and authorizing such medical doctors and other health care specialists to discuss the Participant’s condition with the Company). Notwithstanding anything to the contrary contained herein, and solely for purposes of any Incentive Stock Option, “Disability” shall mean a permanent and total disability (within the meaning of Section 22(e)(3) of the Code).

“*Effective Date*” shall have the meaning set forth in Section 16.1 hereof.

“*Eligible Person*” means any person who is an employee, Non-Employee Director, consultant or other personal service provider of the Company or any of its Subsidiaries.

“*Exchange Act*” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder from time to time.

“*Fair Market Value*” means, with respect to a share of Common Stock as of a given date of determination hereunder, the average of the high and low trading prices for such shares as reported on the principal exchange (including NYSE) on which the Common Stock is then listed on the trading day immediately preceding the date as of which such Fair Market Value is determined, or if the Common Stock was not traded on such date, then on the next preceding trading day that the Common Stock was traded on such exchange, as reported by such responsible reporting service as the Committee may select. If the Common Stock is not listed on any such exchange, “Fair Market Value” shall be such value as determined by the Board or the Committee in its discretion and, to the extent necessary, shall be determined in a manner consistent with Section 409A of the Code and the regulations thereunder.

“*Incentive Stock Option*” means a Stock Option granted under Section 6 hereof that is intended to meet the requirements of Section 422 of the Code and the regulations thereunder.

“*Non-Employee Director*” means a member of the Board who is not an employee of the Company or any of its Subsidiaries.

“*Nonqualified Stock Option*” means a Stock Option granted under Section 6 hereof that is not an Incentive Stock Option.

“*NYSE*” means the New York Stock Exchange.

“*Participant*” means any Eligible Person who holds an outstanding Award under the Plan.

“*Performance Award*” means an Award that is payable based on or conditioned upon the attainment of pre-established business and/or individual Performance Goals over a specified performance period and subject to such conditions as are set forth in the Plan and the applicable Award Agreement (including a Performance Stock Unit) and that is intended to qualify as “performance-based compensation” under Section 162(m) of the Code.

“*Performance-Based Exception*” means the performance-based exception from the tax deductibility limitations of Section 162(m) of the Code.

“*Performance Criteria*” shall have the meaning set forth in Section 10.3 hereof.

“*Performance Goals*” shall have the meaning set forth in Section 10.4 hereof.

“*Performance Stock Unit*” means a Restricted Stock Unit denominated as a Performance Stock Unit under Section 9.2 hereof, to be paid or distributed based on or conditioned upon the attainment of pre-established business and/or individual Performance Goals over a specified performance period.

“*Person*” shall have the meaning ascribed to such term in Section 3(a)(9) of the Exchange Act and used in Sections 13(d) and 14(d) thereof, including a “group” as defined in Section 13(d) thereof.

“*Plan*” means the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan as set forth herein, effective and as may be amended from time to time as provided herein.

“*Public Offering*” means the sale of shares of the Common Stock to the public pursuant to an effective registration statement (other than a registration statement on Form S-4 or S-8 or any similar or successor form) filed under the Securities Act in connection with an underwritten offering.

“*Restricted Stock Award*” means a grant of shares of Common Stock to an Eligible Person under Section 8 hereof that are issued subject to such vesting and transfer restrictions as the Committee shall determine, and such other conditions, as are set forth in the Plan and the applicable Award Agreement.

“*Restricted Stock Unit*” means an unfunded and unsecured contractual right granted to an Eligible Person under Section 9 hereof, denominated in Common Stock, and

representing the right to be paid cash or distributed Common Stock measured by the value of a share of Common Stock in the future, at such times, and subject to such conditions, as are set forth in the Plan and the applicable Award Agreement.

“*Securities Act*” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder from time to time.

“*Service*” means a Participant’s employment with the Company or any Subsidiary or a Participant’s service as a Non-Employee Director, consultant or other service provider with the Company or any Subsidiary, as applicable. Subject to Section 15.8 of this Plan, and unless the Committee expressly provides otherwise, (a) Service will be deemed to continue so long as the Participant is employed by, or otherwise is providing services as a Non-Employee Director, consultant or other service provider with the Company or any Subsidiary, and (b) if a Participant’s Service relationship is with any Subsidiary and that entity ceases to be a Subsidiary, the Participant’s Service will be deemed to have terminated when the entity ceases to be a Subsidiary unless the Participant transfers Service to the Company or any remaining Subsidiary.

“*Stock Appreciation Right*” means a contractual right granted to an Eligible Person under Section 7 hereof entitling such Eligible Person to receive a payment, representing the excess of the Fair Market Value of a share of Common Stock over the base price per share of the right, at such time, and subject to such conditions, as are set forth in the Plan and the applicable Award Agreement.

“*Stock Award*” means a grant of shares of Common Stock to an Eligible Person under Section 11 hereof that are issued free of transfer restrictions and forfeiture conditions.

“*Stock Option*” means a contractual right granted to an Eligible Person under Section 6 hereof to purchase shares of Common Stock at such time and price, and subject to such conditions, as are set forth in the Plan and the applicable Award Agreement.

“*Subsidiary*” means an entity (whether or not a corporation) that is wholly or majority owned or controlled, directly or indirectly, by the Company or any other affiliate of the Company that is so designated, from time to time, by the Committee, during the period of such affiliated status; provided, however, that with respect to Incentive Stock Options, the term “Subsidiary” shall include only an entity that qualifies under Section 424(f) of the Code as a “subsidiary corporation” with respect to the Company.

3. Administration.

3.1 *Committee Members.* The Plan shall be administered by the Committee. To the extent deemed necessary by the Board, the Committee will be comprised of no fewer than two members of the Board who are appointed by the Board to administer the Plan and who each satisfy the requirements for (i) an “independent director” under rules adopted by NYSE or other principal exchange on which the Common Stock is then listed, (ii) a “nonemployee director” for purposes of such Rule 16b-3 under the Exchange Act and (iii) an “outside director” under Section 162(m) of the Code. Notwithstanding the foregoing, the mere fact that a Committee member shall fail to qualify under any of the foregoing requirements shall not

invalidate any Award made by the Committee which Award is otherwise validly made under the Plan. Neither the Company nor any member of the Committee shall be liable for any action or determination made in good faith by the Committee with respect to the Plan or any Award thereunder. The Board shall have the authority to execute the powers of the Committee under the Plan.

3.2 *Committee Authority.* The Committee shall have all powers and discretion necessary or appropriate to administer the Plan and to control its operation, including, but not limited to, the power to (i) determine the Eligible Persons to whom Awards shall be granted under the Plan and to grant Awards, (ii) prescribe the restrictions, terms and conditions of all Awards, (iii) determine the form of settlement of Awards in cash, common stock, other property or a combination thereof, (iv) interpret the Plan and terms of the Awards, (v) adopt rules for the administration, interpretation and application of the Plan as are consistent therewith, and interpret, amend or revoke any such rules, (vi) make all determinations with respect to a Participant's Service and the termination of such Service for purposes of any Award, (vii) correct any defect(s) or omission(s) or reconcile any ambiguity(ies) or inconsistency(ies) in the Plan or any Award thereunder, (viii) make all determinations it deems advisable for the administration of the Plan; (ix) to decide all disputes arising in connection with the Plan and to otherwise supervise the administration of the Plan; (x) subject to the terms of the Plan, amend the terms of an Award in any manner that is not inconsistent with the Plan, (xi) accelerate the vesting or, to the extent applicable, exercisability of any Award at any time (including, but not limited to, upon a Change in Control or upon termination of Service under certain circumstances, as set forth in the Award Agreement or otherwise), and (xii) adopt such procedures and subplans as are necessary or appropriate to permit participation in the Plan by Eligible Person who are foreign nationals or employed outside of the United States. The Committee's determinations under the Plan need not be uniform and may be made by the Committee selectively among Participants and Eligible Persons, whether or not such persons are similarly situated. The Committee shall, in its discretion, consider such factors as it deems relevant in making its interpretations, determinations and actions under the Plan including, without limitation, the recommendations or advice of any officer or employee of the Company or such attorneys, consultants, accountants or other advisors as it may select. All interpretations, determinations, and actions by the Committee shall be final, conclusive, and binding upon all parties.

3.3 *Delegation of Authority.* The Committee shall have the right, from time to time, to delegate in writing to one or more of its members, members of the Board, or officers of the Company the authority of the Committee to grant and determine the terms and conditions of Awards granted under the Plan, subject to any applicable laws. In no event shall any such delegation of authority be permitted with respect to Awards granted to any member of the Board or to any Eligible Person who is subject to Rule 16b-3 under the Exchange Act or is a covered employee under Section 162(m) of the Code (as determined in accordance with applicable guidance as of the applicable date of determination). The Committee shall also be permitted to delegate, to any appropriate officer or employee of the Company, responsibility for performing certain ministerial functions under the Plan. In the event that the Committee's authority is delegated to members of the Board, officers, or employees in accordance with the foregoing, all provisions of the Plan relating to the Committee shall be interpreted in a manner consistent with the foregoing by treating any such reference as a reference to such officer or employee for such purpose. Any action undertaken in accordance with the Committee's delegation of authority

hereunder shall have the same force and effect as if such action was undertaken directly by the Committee and shall be deemed for all purposes of the Plan to have been taken by the Committee.

4. Shares Subject to the Plan.

4.1 *Number of Shares Reserved.* Subject to adjustment as provided in Section 4.5 hereof, the total number of shares of Common Stock that are reserved for issuance under the Plan shall be _____ shares of Common Stock plus any shares remaining available for grant under the PQ Group Holdings Inc. Stock Incentive Plan (the “SIP”) at the time this Plan is approved (collectively, the “Share Reserve”). The maximum number of shares of Common Stock that may be issued in satisfaction of Incentive Stock Options under the Plan is _____ shares. Upon approval of this Plan, no further awards may be made under the SIP. Each share of Common Stock subject to an Award shall reduce the Share Reserve by one share; provided that Awards that are required to be paid in cash pursuant to their terms shall not reduce the Share Reserve. Any shares of Common Stock delivered under the Plan shall consist of authorized and unissued shares or treasury shares.

4.2 *Share Replenishment.* To the extent that an Award granted under this Plan is canceled, expired, forfeited, surrendered, settled by delivery of fewer shares than the number underlying the Award, settled in cash, or otherwise terminated without delivery of the shares to the Participant, the shares of Common Stock retained by or returned to the Company will (i) not be deemed to have been delivered under the Plan, (ii) be available for future Awards under the Plan, and (iii) increase the Share Reserve by one share for each share that is retained by or returned to the Company. Shares that are (x) withheld from an Award in payment of the exercise or purchase price or taxes relating to such an Award or (y) not issued or delivered as a result of the net settlement of an outstanding Stock Option or Stock Appreciation Right will (i) not be deemed to have been delivered under the Plan, (ii) be available for future Awards under the Plan, (iii) increase the Share Reserve by one Share for each Share that is retained by or returned to the Company, and (iv) continue to be counted as outstanding for purposes of determining whether any of the Award limits specified in Section 4.3 or 4.4 have been attained. In addition to the foregoing, any shares that become available for issuance pursuant to Section 4.2 of the SIP as a result of the forfeiture, cancellation or termination for no consideration of an award under the SIP will (i) not be available for future awards under the SIP, (ii) be available for future Awards under this Plan, and (iii) increase the Share Reserve by one share for each share that is retained by or returned to the Company, subject to a maximum of _____ shares (subject to adjustment pursuant to Section 4.5).

4.3 *Non-Cash Awards Granted to Eligible Persons Other Than Non-Employee Directors.* The maximum number of shares of Common Stock that may be subject to each Award type that is granted to an Eligible Person other than a Non-Employee Director during any calendar year shall be limited as follows (subject to adjustment as provided in Section 4.5 hereof): (i) _____ shares of Common Stock subject to Stock Options, (ii) _____ shares of Common Stock subject to Stock Appreciation Rights, (iii) _____ shares of Common Stock subject to Restricted Stock Awards that vest in full or in part based on the attainment of Performance Goals, (iv) _____ shares of Common Stock subject to Restricted Stock Awards that vest in full or in part based on continued employment over a stated period of time, (v)

shares of Common Stock subject to Restricted Stock Units that vest in full or in part based on the attainment of Performance Goals, (vi) _____ shares of Common Stock subject to Restricted Stock Units that vest in full or in part based on continued employment over a stated period of time and (v) _____ shares of Common Stock subject to Stock Awards. If an Award is settled in cash, the number of shares of Common Stock on which the Award is based shall not count toward the individual share limit set forth in this Section 4.3, but shall count against the annual Cash Performance Award limit set forth in Section 10.6.

4.4 *Non-Cash Awards Granted to Non-Employee Directors.* The maximum number of shares of Common Stock that may be subject to Stock Options, Stock Appreciation Rights, Restricted Stock Awards, Restricted Stock Units and Stock Awards granted to any Non-Employee Director during any calendar year shall be limited to _____ shares of Common Stock for all such Award types in the aggregate (subject to adjustment as provided in Section 4.5 hereof). If an Award is settled in cash, the number of shares of Common Stock on which the Award is based shall not count toward the individual share limit set forth in this Section 4.4 but shall count against the annual Cash Performance Award limit set forth in Section 10.6.

4.5 *Adjustments.* If there shall occur any change with respect to the outstanding shares of Common Stock by reason of any recapitalization, reclassification, stock dividend, extraordinary cash dividend, stock split, reverse stock split or other distribution with respect to the shares of Common Stock or any merger, reorganization, consolidation, combination, spin-off, stock purchase or other similar corporate change or any other change affecting the Common Stock (other than regular cash dividends to shareholders of the Company), the Committee shall, in the manner and to the extent it considers appropriate and equitable to the Participants and consistent with the terms of the Plan, cause an adjustment to be made to (i) the maximum number and kind of shares of Common Stock provided in Sections 4.1, 4.3 and 4.4 hereof (including the maximum number of shares of Common Stock that may become payable to a Participant provided in Sections 4.3 and 4.4 hereof), (ii) the number and kind of shares of Common Stock, units or other rights subject to then outstanding Awards, (iii) the exercise or base price for each share or unit or other right subject to then outstanding Awards, (iv) the maximum amount that may become payable to a Participant under Cash Awards provided in Section 10.6 hereof, and (v) any other terms of an Award that are affected by the event. Notwithstanding the foregoing, any such adjustments shall be made with due regard for the requirements of Section 409A of the Code, the performance-based compensation rules of Section 162(m) of the Code, and the qualification of Incentive Stock Options under Section 424(a) of the Code, to the extent applicable.

5. Eligibility and Awards.

5.1 *Designation of Participants.* Any Eligible Person may be selected by the Committee to receive an Award and become a Participant. The Committee has the authority, in its discretion, to determine and designate from time to time those Eligible Persons who are to be granted Awards, the types of Awards to be granted, the number of shares of Common Stock or units subject to Awards to be granted and the terms and conditions of such Awards consistent with the terms of the Plan, and to grant any such Awards. In selecting Eligible Persons to be Participants, and in determining the type and amount of Awards to be granted under the Plan, the Committee shall consider any and all factors that it deems relevant or appropriate. Designation

of a Participant in any year shall not require the Committee to designate such person to receive an Award in any other year or, once designated, to receive the same type or amount of Award as granted to such Participant in any other year.

5.2 *Determination of Awards.* The Committee shall determine the terms and conditions of all Awards granted to Participants in accordance with its authority under Section 3.2 hereof. An Award may consist of one type of right or benefit hereunder or of two or more such rights or benefits granted in tandem.

5.3 *Award Agreements.* Each Award granted to an Eligible Person shall be represented by an Award Agreement. The terms of all Awards under the Plan, as determined by the Committee, will be set forth in each individual Award Agreement as described in Section 15.2 hereof.

6. Stock Options.

6.1 *Grant of Stock Options.* A Stock Option may be granted to any Eligible Person selected by the Committee, except that an Incentive Stock Option may only be granted to an Eligible Person satisfying the conditions of Section 6.7(a) hereof. Each Stock Option shall be designated on the Date of Grant, in the discretion of the Committee, as an Incentive Stock Option or as a Nonqualified Stock Option. To the extent a Stock Option is not so designated, it shall be treated for all purposes as a Nonqualified Stock Option.

6.2 *Exercise Price.* The exercise price per share of a Stock Option shall not be less than one hundred percent (100%) of the Fair Market Value of a share of Common Stock on the Date of Grant. The Committee may in its discretion specify an exercise price per share that is higher than the Fair Market Value of a share of Common Stock on the Date of Grant.

6.3 *Vesting of Stock Options.* The Committee shall, in its discretion, prescribe the time or times at which or the conditions upon which, a Stock Option or portion thereof shall become vested and/or exercisable. The requirements for vesting and exercisability of a Stock Option may be based on the continued Service of the Participant with the Company or a Subsidiary for a specified time period (or periods), on the attainment of a specified Performance Goal(s) or on such other terms and conditions as approved by the Committee in its discretion, all as set forth in the Award Agreement. If the vesting requirements of a Stock Option are not satisfied, the Award shall be forfeited.

6.4 *Term of Stock Options.* The Committee shall in its discretion prescribe in an Award Agreement the period during which a vested Stock Option may be exercised; provided, however, that the maximum term of a Stock Option shall be ten (10) years from the Date of Grant. The Committee may provide that a Stock Option will cease to be exercisable upon or at the end of a specified time period following a termination of Service for any reason as set forth in the Award Agreement or otherwise. Subject to Section 409A of the Code and the provisions of this Section 6, the Committee may extend at any time the period in which a Stock Option may be exercised.

6.5 *Stock Option Exercise; Tax Withholding* Subject to such terms and conditions as specified in an Award Agreement, a Stock Option may be exercised in whole or in part at any

time during the term thereof by notice in the form required by the Company, together with payment of the aggregate exercise price and applicable withholding tax. Payment of the exercise price may be made: (i) in cash or by cash equivalent acceptable to the Committee or (ii) to the extent permitted by the Committee in its sole discretion and set forth in the Award Agreement or otherwise (including by a policy or resolution of the Committee), (A) in shares of Common Stock valued at the Fair Market Value of such shares on the date of exercise, (B) through an open-market, broker-assisted sales transaction pursuant to which the Company is promptly delivered the amount of proceeds necessary to satisfy the exercise price, (C) by reducing the number of shares of Common Stock otherwise deliverable upon the exercise of the Stock Option by the number of shares of Common Stock having a Fair Market Value on the date of exercise equal to the exercise price, (D) by a combination of the methods described above or (E) by such other method as may be approved by the Committee and set forth in the Award Agreement. In addition to and at the time of payment of the exercise price, the Participant shall pay to the Company the full amount of any and all applicable income tax, employment tax and other amounts required to be withheld in connection with such exercise, payable under such of the methods described above for the payment of the exercise price as may be approved by the Committee and set forth in the Award Agreement.

6.6 Limited Transferability of Nonqualified Stock Options. All Nonqualified Stock Options shall be exercisable during the Participant's lifetime only by the Participant or by the Participant's guardian or legal representative. The Nonqualified Stock Options and the rights and privileges conferred thereby shall be nontransferable except as otherwise provided in Section 15.3 hereof.

6.7 Additional Rules for Incentive Stock Options.

(a) *Eligibility.* An Incentive Stock Option may only be granted to an Eligible Person who is considered an employee for purposes of Treasury Regulation §1.421-1(h) with respect to the Company or any Subsidiary that qualifies as a "subsidiary corporation" with respect to the Company for purposes of Section 424(f) of the Code.

(b) *Annual Limits.* No Incentive Stock Option shall be granted to a Participant as a result of which the aggregate Fair Market Value (determined as of the Date of Grant) of the Common Stock with respect to which Incentive Stock Options under Section 422 of the Code are exercisable for the first time in any calendar year under the Plan and any other stock option plans of the Company or any subsidiary or parent corporation, would exceed \$100,000, determined in accordance with Section 422(d) of the Code. This limitation shall be applied by taking such Incentive Stock Options into account in the order in which they were granted.

(c) *Additional Limitations.* In the case of any Incentive Stock Option granted to an Eligible Person who owns, either directly or indirectly (taking into account the attribution rules contained in Section 424(d) of the Code), stock possessing more than ten percent (10%) of the total combined voting power of all classes of stock of the Company or any Subsidiary, the exercise price shall not be less than one hundred ten percent (110%) of the Fair Market Value of a share of Common Stock on the Date of Grant and the maximum term shall be five (5) years.

(d) *Termination of Employment.* An Award of an Incentive Stock Option may provide that such Stock Option may be exercised not later than (i) three (3) months following termination of employment of the Participant with the Company and all Subsidiaries (other than as set forth in clause (ii) of this Section 6.7(d)) or (ii) one year following termination of employment of the Participant with the Company and all Subsidiaries due to death or permanent and total disability within the meaning of Section 22(e)(3) of the Code, in each case as and to the extent determined by the Committee to comply with the requirements of Section 422 of the Code.

(e) *Other Terms and Conditions; Nontransferability.* No Incentive Stock Options granted under the Plan may be granted more than ten (10) years following the date that the Plan is adopted or the date that the Plan is approved by the Company's stockholders, whichever is earlier. The Award Agreement representing any Incentive Stock Option granted hereunder shall contain such additional terms and conditions, not inconsistent with the terms of the Plan, as are deemed necessary or desirable by the Committee, which terms, together with the terms of the Plan, shall be intended and interpreted to cause such Incentive Stock Option to qualify as an "incentive stock option" under Section 422 of the Code. A Stock Option that is granted as an Incentive Stock Option shall, to the extent it fails to qualify as an "incentive stock option" under the Code, be treated as a Nonqualified Stock Option. An Incentive Stock Option shall by its terms be nontransferable other than by will or by the laws of descent and distribution, and shall be exercisable during the lifetime of a Participant only by such Participant. Nothing herein shall limit the ability of the Committee to take an action otherwise permitted by the Plan even if such action would result in an Incentive Stock Option failing to qualify as one.

(f) *Disqualifying Dispositions.* If shares of Common Stock acquired by exercise of an Incentive Stock Option are disposed of within two years following the Date of Grant or one year following the transfer of such shares to the Participant upon exercise, the Participant shall, promptly following such disposition, notify the Company in writing of the date and terms of such disposition and provide such other information regarding the disposition as the Company may reasonably require.

6.8 *Repricing Prohibited.* Except as provided in Sections 4.5 and 12 hereof, without the prior approval of the Company's stockholders, neither the Committee nor the Board shall cancel a Stock Option when the exercise price per share exceeds the Fair Market Value of one share of Common Stock in exchange for cash or another Award (other than in connection with a Change in Control) or cause the cancellation, substitution or amendment of a Stock Option that would have the effect of reducing the exercise price of such a Stock Option previously granted under the Plan or otherwise approve any modification to such a Stock Option that would be treated as a "repricing" under the then applicable rules, regulations or listing requirements adopted by NYSE or any other principal exchange on which the Common Stock is then listed.

6.9 *Dividend Equivalent Rights.* Subject to the anti-dilution adjustment provisions contained in Section 4.5 hereof, dividends shall not be paid with respect to Stock Options. Dividend equivalent rights shall be granted with respect to the shares of Common Stock subject to Stock Options to the extent permitted by the Committee or set forth in the Award Agreement.

7. Stock Appreciation Rights.

7.1 *Grant of Stock Appreciation Rights.* Stock Appreciation Rights may be granted to any Eligible Person selected by the Committee. Stock Appreciation Rights may be granted on a basis that allows for the exercise of the right by the Participant or that provides for the automatic payment of the right upon a specified date or event. Stock Appreciation Rights shall be non-transferable, except as provided in Section 15.3 hereof.

7.2 *Stand-Alone and Tandem Stock Appreciation Rights.* A Stock Appreciation Right may be granted without any related Stock Option, or may be granted in tandem with a Stock Option, either on the Date of Grant or at any time thereafter during the term of the Stock Option. The Committee shall in its discretion provide in an Award Agreement the time or times at which or the conditions upon which, a Stock Appreciation Right or portion thereof shall become vested and/or exercisable. The requirements for vesting and exercisability of a Stock Appreciation Right may be based on the continued Service of a Participant with the Company or a Subsidiary for a specified time period (or periods), on the attainment of a specified Performance Goal(s) or on such other terms and conditions as approved by the Committee in its discretion. If the vesting requirements of a Stock Appreciation Right are not satisfied, the Award shall be forfeited. A Stock Appreciation Right will be exercisable or payable at such time or times as determined by the Committee; provided, that the maximum term of a Stock Appreciation Right shall be ten (10) years from the Date of Grant. The Committee may provide that a Stock Appreciation Right will cease to be exercisable upon or at the end of a period following a termination of Service for any reason. The base price of a Stock Appreciation Right granted without any related Stock Option shall be determined by the Committee in its discretion; provided, however, that the base price per share of any such stand-alone Stock Appreciation Right shall not be less than one hundred percent (100%) of the Fair Market Value of a share of Common Stock on the Date of Grant.

7.3 *Payment of Stock Appreciation Rights.* A Stock Appreciation Right will entitle the holder, upon exercise or other payment of the Stock Appreciation Right, as applicable, to receive an amount determined by multiplying: (i) the excess of the Fair Market Value of a share of Common Stock on the date of exercise or payment of the Stock Appreciation Right over the base price of such Stock Appreciation Right, by (ii) the number of shares as to which such Stock Appreciation Right is exercised or paid. Payment of the amount determined under the foregoing may be made, as approved by the Committee and set forth in the Award Agreement, in shares of Common Stock valued at their Fair Market Value on the date of exercise or payment, in cash or in a combination of shares of Common Stock and cash, subject to applicable tax withholding requirements.

7.4 *Repricing Prohibited.* Except as provided in Sections 4.5 and 12 hereof, without the prior approval of the Company's stockholders, neither the Committee nor the Board shall cancel a Stock Appreciation Right when the base price per share exceeds the Fair Market Value of one share of Common Stock in exchange for cash or another Award (other than in connection with a Change in Control) or cause the cancellation, substitution or amendment of a Stock Appreciation Right that would have the effect of reducing the base price of such a Stock Appreciation Right previously granted under the Plan or otherwise approve any modification to such Stock Appreciation Right that would be treated as a "repricing" under the then applicable rules, regulations or listing requirements adopted by NYSE or any other principal exchange on which the Common Stock is then listed.

7.5 *Dividend Equivalent Rights*. Subject to the anti-dilution adjustment provisions contained in Section 4.5 hereof, dividends shall not be paid with respect to Stock Appreciation Rights. Dividend equivalent rights shall be granted with respect to the shares of Common Stock subject to Stock Appreciation Rights to the extent permitted by the Committee or set forth in the Award Agreement.

8. Restricted Stock Awards.

8.1 *Grant of Restricted Stock Awards*. A Restricted Stock Award may be granted to any Eligible Person selected by the Committee. The Committee may require the payment by the Participant of a specified purchase price in connection with any Restricted Stock Award.

8.2 *Vesting Requirements*. The restrictions imposed on shares granted under a Restricted Stock Award shall lapse in accordance with the vesting requirements specified by the Committee in the Award Agreement. The requirements for vesting of a Restricted Stock Award may be based on the continued Service of the Participant with the Company or a Subsidiary for a specified time period (or periods), on the attainment of a specified Performance Goal(s), or on such other terms and conditions as approved by the Committee in its discretion. If the vesting requirements of a Restricted Stock Award shall not be satisfied or, if applicable, the Performance Goal(s) with respect to such Restricted Stock Award are not attained, the Award shall be forfeited and the shares of Stock subject to the Award shall be returned to the Company.

8.3 *Transfer Restrictions*. Shares granted under any Restricted Stock Award may not be transferred, assigned or subject to any encumbrance, pledge or charge until all applicable restrictions are removed or have expired, except as provided in Section 15.3 hereof. Failure to satisfy any applicable restrictions shall result in the subject shares of the Restricted Stock Award being forfeited and returned to the Company. The Committee may require in an Award Agreement that certificates (if any) representing the shares granted under a Restricted Stock Award bear a legend making appropriate reference to the restrictions imposed, and that certificates (if any) representing the shares granted or sold under a Restricted Stock Award will remain in the physical custody of an escrow holder until all restrictions are removed or have expired.

8.4 *Rights as Stockholder*. Subject to the foregoing provisions of this Section 8 and the applicable Award Agreement, the Participant shall have all rights of a stockholder with respect to the shares granted to the Participant under a Restricted Stock Award, including the right to vote the shares and receive all dividends and other distributions paid or made with respect thereto, unless otherwise provided in the applicable Award Agreement or the Committee determines otherwise at the time the Restricted Stock Award is granted. The Committee may provide in an Award Agreement for the payment of dividends and distributions to the Participant at such times as paid to stockholders generally, at the times of vesting or other payment of the Restricted Stock Award or otherwise.

8.5 *Section 83(b) Election.* If a Participant makes an election pursuant to Section 83(b) of the Code with respect to a Restricted Stock Award, the Participant shall file, within thirty (30) days following the Date of Grant, a copy of such election with the Company and with the Internal Revenue Service, in accordance with the regulations under Section 83 of the Code. The Committee may provide in an Award Agreement that the Restricted Stock Award is conditioned upon the Participant's making or refraining from making an election with respect to the Award under Section 83(b) of the Code.

9. Restricted Stock Units.

9.1 *Grant of Restricted Stock Units.* A Restricted Stock Unit may be granted to any Eligible Person selected by the Committee. The value of each Restricted Stock Unit is equal to the Fair Market Value of the Common Stock on the applicable date or time period of determination, as specified by the Committee. Restricted Stock Units shall be subject to such restrictions and conditions as the Committee shall determine. In addition, a Restricted Stock Unit may be designated as a "Performance Stock Unit", the vesting requirements of which may be based, in whole or in part, on the attainment of pre-established business and/or individual Performance Goal(s) over a specified performance period, as approved by the Committee in its discretion. Restricted Stock Units shall be non-transferable, except as provided in Section 15.3 hereof.

9.2 *Vesting of Restricted Stock Units.* On the Date of Grant, the Committee shall, in its discretion, determine any vesting requirements with respect to Restricted Stock Units, which shall be set forth in the Award Agreement. The requirements for vesting of a Restricted Stock Unit may be based on the continued Service of the Participant with the Company or a Subsidiary for a specified time period (or periods) or on such other terms and conditions as approved by the Committee (including Performance Goal(s)) in its discretion. If the vesting requirements of a Restricted Stock Units Award are not satisfied, the Award shall be forfeited.

9.3 *Payment of Restricted Stock Units.* Restricted Stock Units shall become payable to a Participant at the time or times determined by the Committee and set forth in the Award Agreement, which may be upon or following the vesting of the Award. Payment of a Restricted Stock Unit may be made, as approved by the Committee and set forth in the Award Agreement, in cash or in shares of Common Stock or in a combination thereof, subject to applicable tax withholding requirements. Any cash payment of a Restricted Stock Unit shall be made based upon the Fair Market Value of the Common Stock.

9.4 *Dividend Equivalent Rights.* Subject to the anti-dilution adjustment provisions contained in Section 4.5 hereof, Restricted Stock Units may or may not, in the discretion of the Committee, be granted together with a dividend equivalent right with respect to the shares of Common Stock subject to the Award, which may be accumulated and may be deemed reinvested in additional Restricted Stock Units or may be accumulated in cash, as determined by the Committee in its discretion. Dividend equivalent rights will be paid at such times as determined by the Committee in its discretion (including without limitation at the times paid to stockholders generally or at the times of vesting or payment of the Restricted Stock Unit). Dividend equivalent rights may be subject to forfeiture under the same conditions as apply to the underlying Restricted Stock Units.

10. Cash Awards and Performance Awards: Performance Criteria

10.1 *Grant of Cash Awards and Performance Awards.* A Cash Award may be granted to any Eligible Person selected by the Committee. Payment amounts may be based on specified levels of attainment with respect to the Performance Goals, including, if applicable, specified threshold, target and maximum performance levels. The requirements for payment may be also based upon the continued Service of the Participant with the Company or a Subsidiary during the respective performance period and on such other conditions as determined by the Committee and set forth in an Award Agreement. With respect to Performance Awards, before the ninetieth (90th) day of the applicable performance period (or, if the performance period is less than one year, no later than the number of days which is equal to twenty-five percent (25%) of such performance period), the Committee will determine the duration of the performance period, the Performance Criteria, the applicable Performance Goals relating to the Performance Criteria, and the amount and terms of payment and/or vesting upon achievement of the Performance Goals. The preceding sentence and other terms of the Plan relating to compliance with Section 162(m) requirements and other similar provisions will not apply to an Award eligible (as determined by the Committee) for exemption from the limitations of Section 162(m) of the Code by reason of the post-initial public offering transition relief in Section 1.162-27(f) of the Treasury Regulation. Cash Awards shall be non-transferable, except as provided in Section 15.3 hereof.

10.2 *Award Agreements.* Each Cash Award shall be evidenced by an Award Agreement that shall specify the terms and conditions of the Award as the Committee, in its discretion, shall determine.

10.3 *Performance Criteria.* For purposes of Performance Awards, the Performance Criteria shall be one or any combination of the following, for the Company or any identified Subsidiary or business unit, as determined by the Committee: (a) net earnings; (b) earnings per share; (c) net debt; (d) revenue or sales growth; (e) net or operating income; (f) net operating profit; (g) return measures (including, but not limited to, return on assets, capital, equity or sales); (h) cash flow (including, but not limited to, operating cash flow, distributable cash flow and free cash flow); (i) earnings before or after taxes, interest, depreciation, amortization and/or rent; (j) share price (including, but not limited to growth measures and total or relative stockholder return); (k) expense control or loss management; (l) customer satisfaction; (m) market share; (n) economic value added; (o) working capital; (p) the formation of joint ventures or the completion of other corporate transactions; (q) gross or net profit margins; (r) revenue mix; (s) operating efficiency; (t) product diversification; (u) market penetration; (v) measurable achievement in quality, operation or compliance initiatives; (w) quarterly dividends or distributions; (x) employee retention or turnover; or (y) any combination of or a specified increase in any of the foregoing. Each of the Performance Criteria shall be applied and interpreted in accordance with an objective formula or standard established by the Committee at the time the applicable Award is granted including, without limitation, GAAP.

10.4 *Performance Goals.* For purposes of Performance Awards, the "Performance Goals" shall be the levels of achievement relating to the Performance Criteria selected by the Committee for the Award. For purposes of Performance Awards, the Performance Goals shall be written and shall be expressed as an objective formula or standard that precludes discretion to increase the amount of compensation payable that would otherwise be due upon attainment of

the goal. The Performance Goals may be applied on an absolute basis or relative to an identified index, peer group, or one or more competitors or other companies (including particular business segments or divisions or such companies), as specified by the Committee. The Performance Goals need not be the same for all Participants. The Committee may, subject to the terms of the Plan, amend a previously granted Performance Award or take any other action that disqualifies such Award from the performance-based compensation exception under Section 162(m).

10.5 *Adjustments*. At the time that an Award is granted, the Committee may provide for the Performance Goals or the manner in which performance will be measured against the Performance Goals to be adjusted in such objective manner as it deems appropriate, including, without limitation, adjustments to reflect charges for restructurings, non-operating income, the impact of corporate transactions or discontinued operations, extraordinary and other unusual or non-recurring items and the cumulative effects of accounting or tax law changes. In addition, with respect to a Participant hired or promoted following the beginning of a performance period, the Committee may determine to prorate the Performance Goals and/or the amount of any payment in respect of such Participant's Awards for the partial performance period.

10.6 *Maximum Amount of Cash Awards*. The maximum amount that may become payable to any one Participant during any one calendar year under all Cash Awards is limited to \$.

10.7 *Negative Discretion*. Notwithstanding anything else contained in the Plan to the contrary, the Committee shall, to the extent provided in an Award Agreement, have the right, in its discretion, (i) to reduce or eliminate the amount otherwise payable to any Participant under an Award and (ii) to establish rules or procedures that have the effect of limiting the amount payable to any Participant to an amount that is less than the amount that otherwise would be payable under an Award. The Committee may exercise such discretion in a non-uniform manner among Participants. The Committee shall not have discretion to increase the amount that otherwise would be payable to any Participant under a Performance Award.

10.8 *Certification*. Following the conclusion of the performance period of a Performance Award, the Committee shall certify in writing whether the Performance Goals for that performance period have been achieved, or certify the degree of achievement, if applicable.

10.9 *Payment*. Upon certification of the Performance Goals for a Performance Award, the Committee shall determine the level of vesting or amount of payment to the Participant pursuant to the Award, if any. Notwithstanding the foregoing, Cash Awards may be paid, at the discretion of the Committee, in any combination of cash or shares of Common Stock, based upon the Fair Market Value of such shares at the time of payment (with the limit set forth in Section 10.6 applying, valuing any shares delivered based on their then Fair Market Value).

11. Stock Awards.

11.1 *Grant of Stock Awards*. A Stock Award may be granted to any Eligible Person selected by the Committee. A Stock Award may be granted for past Service, in lieu of bonus or other cash compensation, as directors' compensation or for any other valid purpose as determined by the Committee. The Committee shall determine the terms and conditions of such

Awards, and such Awards may be made without vesting requirements. In addition, the Committee may, in connection with any Stock Award, require the payment of a specified purchase price.

11.2 *Rights as Stockholder.* Subject to the foregoing provisions of this Section 11 and the applicable Award Agreement, upon the issuance of the Common Stock under a Stock Award the Participant shall have all rights of a stockholder with respect to the shares of Common Stock, including the right to vote the shares and receive all dividends and other distributions paid or made with respect thereto.

12. Change in Control.

12.1 *Effect on Awards.* Upon the occurrence of a Change in Control, unless otherwise provided in the Award Agreement, the Committee is authorized (but not obligated) to make adjustments in the terms and conditions of outstanding Awards, including without limitation the following (or any combination thereof): (a) continuation or assumption of such outstanding Awards under the Plan by the Company (if it is the surviving company or corporation) or by the surviving company or corporation or its parent; (b) substitution by the surviving company or corporation or its parent of awards with substantially the same terms for outstanding Awards (with appropriate adjustments to the type of consideration payable upon settlement of the Awards); (c) accelerated exercisability, vesting and/or payment under outstanding Awards immediately prior to or upon the occurrence of such event or upon a termination of employment following such event; and (d) if all or substantially all of the Company's outstanding shares of Common Stock transferred in exchange for cash consideration in connection with such Change in Control: (i) upon written notice, provide that any outstanding Stock Options and Stock Appreciation Rights are exercisable during a reasonable period of time immediately prior to the scheduled consummation of the event or such other reasonable period as determined by the Committee (contingent upon the consummation of the event), and at the end of such period, such Stock Options and Stock Appreciation Rights shall terminate to the extent not so exercised within the relevant period; and (ii) cancellation of some or all or any portion of outstanding Awards in exchange for a payment (in the form of cash, shares, other property or any combination thereof as determined by the Committee) equal, in the case of each affected Award or portion thereof, to the excess, if any, of (A) the Fair Market Value of one share of Common Stock times the number of shares of Common Stock subject to the Award or such portion, over (B) the aggregate exercise or purchase price, if any, under the Award or such portion (in the case of a Stock Appreciation Right, the aggregate base value above which appreciation is measured), in each case on such payment terms (which need not be the same as the terms of payment to holders of Common Stock) and other terms, and subject to such conditions, as the Committee determines; *provided, however*, for the avoidance of doubt, that if the exercise or purchase price (or base value) of an Award is equal to or greater than the Fair Market Value of one share of Common Stock, the Award may be cancelled with no payment due hereunder or otherwise in respect of such Award.

12.2 *Definition of Change in Control.* Unless otherwise defined in an Award Agreement, “*Change in Control*” shall mean the occurrence of one of the following events:

(a) Any Person, becomes the Beneficial Owner, directly or indirectly, of more than fifty percent (50%) of the combined voting power, excluding any Person who holds fifty percent (50%) or more of the voting power on the Effective Date of the Plan (the “*Initial Owners*”), of the then outstanding voting securities of the Company entitled to vote generally in the election of its directors (the “*Outstanding Company Voting Securities*”) including by way of merger, consolidation or otherwise; *provided, however*, that for purposes of this definition, the following acquisitions shall not constitute a Change in Control: (i) any acquisition of voting securities of the Company directly from the Company, including without limitation, a Public Offering of securities; (ii) any acquisition by the Company or any of its Subsidiaries of Outstanding Company Voting Securities, including an acquisition by any employee benefit plan or related trust sponsored or maintained by the Company or any of its Subsidiaries; or (iii) any acquisition after which the Initial Owners and their affiliates remain the Beneficial Owners of more Outstanding Voting Securities than any other Person.

(b) Consummation of a reorganization, merger, or consolidation to which the Company is a party or a sale or other disposition of all or substantially all of the assets of the Company (a “*Business Combination*”), unless, following such Business Combination: (i) any individuals and entities that were the Beneficial Owners of Outstanding Company Voting Securities immediately prior to such Business Combination are the Beneficial Owners, directly or indirectly, of more than fifty percent (50%) of the combined voting power of the outstanding voting securities entitled to vote generally in the election of directors (or election of members of a comparable governing body) of the entity resulting from the Business Combination (including, without limitation, an entity which as a result of such transaction owns all or substantially all of the Company or all or substantially all of the Company’s assets either directly or through one or more Subsidiaries) (the “*Successor Entity*”) in substantially the same proportions as their ownership immediately prior to such Business Combination; (ii) no Person (excluding any Successor Entity or any employee benefit plan or related trust of the Company, such Successor Entity, or any of their Subsidiaries) is the Beneficial Owner, directly or indirectly, of more than fifty percent (50%) of the combined voting power of the then outstanding voting securities entitled to vote generally in the election of directors (or comparable governing body) of the Successor Entity, except to the extent that such ownership existed prior to the Business Combination; and (iii) at least a majority of the members of the board of directors (or comparable governing body) of the Successor Entity were incumbent Directors (including persons deemed to be incumbent Directors) at the time of the execution of the initial agreement or of the action of the Board providing for such Business Combination.

Notwithstanding the foregoing, to the extent necessary to comply with Section 409A of the Code with respect to the payment of “nonqualified deferred compensation,” “Change in Control” shall be limited to a “change in control event” as defined under Section 409A of the Code. For the avoidance of doubt, neither a Public Offering nor any changes to the size or members of the Board in connection with or as a result of a public offering shall constitute or be deemed to result in a Change in Control.

13. Forfeiture Events.

13.1 *General.* The Committee may specify in an Award Agreement at the time of the Award that the Participant’s rights, payments and benefits with respect to an Award shall be

subject to reduction, cancellation, forfeiture or recoupment upon the occurrence of certain specified events, in addition to any otherwise applicable vesting or performance conditions of an Award. Such events may include, but shall not be limited to, termination of Service for Cause, violation of material Company policies, breach of noncompetition, confidentiality or other restrictive covenants that may apply to the Participant or other similar conduct by the Participant that is detrimental to the business or reputation of the Company.

13.2 Termination for Cause.

(a) *Treatment of Awards.* Unless otherwise provided by the Committee and set forth in an Award Agreement, the following rules will apply if a Participant's Service ceases:

(i) Except as provided in (ii) and (iii) below, immediately upon the cessation of the Participant's Service each Stock Option and Stock Appreciation Right that is then held by the Participant or by the Participant's permitted transferees, if any, will cease to be exercisable and will terminate and all other Awards that are then held by the Participant or by the Participant's permitted transferees, if any, to the extent not already vested will be forfeited.

(ii) Subject to (iii) and (iv) below, all Stock Options and Stock Appreciation Rights held by the Participant or the Participant's permitted transferees, if any, immediately prior to the cessation of the Participant's Service, to the extent then exercisable, will remain exercisable for the lesser of (i) a period of three months or (ii) the period ending on the latest date on which such Stock Option or Stock Appreciation Right could have been exercised without regard to this Section 13.2(a), and will thereupon immediately terminate.

(iii) Subject to (iv) below, all Stock Options and Stock Appreciation Rights held by a Participant or the Participant's permitted transferees, if any, immediately prior to the Participant's death, to the extent then exercisable, will remain exercisable for the lesser of (i) the one year period ending with the first anniversary of the Participant's death or (ii) the period ending on the latest date on which such Stock Option or Stock Appreciation Right could have been exercised without regard to this Section 13.2(a), and will thereupon immediately terminate.

(iv) All Stock Options and Stock Appreciation Rights (whether or not exercisable) held by a Participant or the Participant's permitted transferees, if any, immediately prior to the cessation of the Participant's Service will immediately terminate upon such cessation of Service if the termination is for Cause or occurs in circumstances that in the determination of the Committee would have constituted grounds for the Participant's Service to be terminated for Cause.

(b) *Post-Termination Breaches.* Unless otherwise provided by the Committee and set forth in an Award Agreement, if (i) a Participant's Service with the Company or any Subsidiary is terminated for Cause or (ii) within one (1) year following termination of Service for any other reason, the Committee determines in its discretion that, after termination, the Participant breached any of the material terms contained in any non-competition agreement, confidentiality agreement or similar restrictive covenant agreement to which such Participant is a party, such Participant's rights, payments and benefits with respect to an Award shall be subject

to cancellation, forfeiture and/or recoupment, as provided in Section 13.3 below. The Company shall have the power to determine whether the Participant has been terminated for Cause, the date upon which such termination for Cause occurs and whether the Participant engaged in conduct that violated any continuing obligation or duty of the Participant in respect of the Company or any Subsidiary. Any such determination shall be final, conclusive and binding upon all Persons. In addition, if the Company shall reasonably determine that a Participant has committed or may have committed any act which could constitute the basis for a termination of such Participant's Service for Cause or violates any continuing obligation or duty of the Participant in respect of the Company or any Subsidiary, the Company may suspend the Participant's rights to exercise any Stock Option or Stock Appreciation Right, receive any payment or vest in any right with respect to any Award pending a determination by the Company of whether an act or omission could constitute the basis for a termination for Cause as provided in this Section 13.2.

(c) *Definition of Cause.* Unless otherwise defined in an Award Agreement, "Cause" shall mean:

(i) the Participant has committed a deliberate and premeditated act against the interests of the Company including, without limitation: an act of fraud, embezzlement, misappropriation or breach of fiduciary duty against the Company, including, but not limited to, the offer, payment, solicitation or acceptance of any unlawful bribe or kickback with respect to the Company's business; or

(ii) the Participant has been convicted by a court of competent jurisdiction of, or pleaded guilty or nolo contendere to, any felony or any crime involving moral turpitude; or

(iii) the Participant has failed to perform or neglected the material duties incident to his or her employment or other engagement with the Company on a regular basis, and such refusal or failure shall have continued for a period of twenty (20) days after written notice to the Participant specifying such refusal or failure in reasonable detail; or

(iv) the Participant has been chronically absent from work (excluding vacations, illnesses, Disability or leaves of absence approved by the Company); or

(v) the Participant has refused, after explicit written notice, to obey any lawful resolution of or direction by the Board which is consistent with the duties incident to his or her employment or other engagement with the Company and such refusal continues for more than twenty (20) days after written notice is given to the Participant specifying such refusal in reasonable detail; or

(vi) the Participant has breached any of the material terms contained in any employment agreement, non-competition agreement, confidentiality agreement or similar type of agreement to which such Participant is a party; or

(vii) the Participant has engaged in (x) the unlawful use (including being under the influence) or possession of illegal drugs on the Company's premises or (y) habitual drunkenness on the Company's premises.

Any voluntary termination of employment or other engagement by the Participant in anticipation of an involuntary termination of the Participant's Service for Cause shall be deemed to be a termination for "Cause." Notwithstanding the foregoing, in the event that a Participant is party to an employment, severance or similar agreement with the Company or any of its affiliates and such agreement contains a definition of "Cause," the definition of "Cause" set forth above shall be deemed replaced and superseded, with respect to such Participant, by the definition of "Cause" used in such employment, severance or similar agreement for so long as such agreement remains in effect.

13.3 *Right of Recapture.*

(a) *General.* If at any time within one (1) year (or such longer time specified in an Award Agreement or other agreement with a Participant) after the date on which a Participant exercises a Stock Option or Stock Appreciation Right or on which a Stock Award, Restricted Stock Award or Restricted Stock Unit vests or becomes payable or on which a Cash Award is paid to a Participant, or on which income otherwise is realized by a Participant in connection with an Award, (i) a Participant's Service is terminated for Cause or (ii) after a Participant's Service otherwise terminates for any other reason, the Committee determines in its discretion that, after termination, the Participant breached any of the material terms contained in any non-competition agreement, confidentiality agreement, severance agreement, or similar restrictive covenant agreement to which such Participant is a party, then any gain realized by the Participant from the exercise, vesting, payment or other realization of income by the Participant in connection with an Award, shall be paid by the Participant to the Company upon notice from the Company, subject to applicable state law. Such gain shall be determined as of the date or dates on which the gain is realized by the Participant, without regard to any subsequent change in the Fair Market Value of a share of Common Stock. To the extent not otherwise prohibited by law, the Company shall have the right to offset such gain against any amounts otherwise owed to the Participant by the Company (whether as wages, vacation pay or pursuant to any benefit plan or other compensatory arrangement).

(b) *Forfeiture or Clawback of Awards Under Applicable Law and Company Policy.* If the Company is required to prepare an accounting restatement due to the material noncompliance of the Company, as a result of misconduct, with any financial reporting requirement under the securities laws, then any Participant who is one of the individuals subject to automatic forfeiture under Section 304 of the Sarbanes-Oxley Act of 2002 will reimburse the Company for the amount of any Award received by such individual under this Plan during the 12-month period following the first public issuance or filing with the Securities and Exchange Commission, as the case may be, of the financial document embodying such financial reporting requirement. The Company also may seek to recover any Award made as required by the provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act or any other clawback, forfeiture or recoupment provision required by applicable law or under the requirements of any stock exchange or market upon which the shares of Common Stock are then listed or traded. In addition, all Awards under this Plan will be subject to forfeiture or other penalties pursuant to any clawback or forfeiture policy of the Company, as in effect from time to time, and such forfeiture and/or penalty conditions or provisions as determined by the Committee and set forth in the applicable Award Agreement.

14. Transfer, Leave of Absence, Etc. For purposes of the Plan, except as otherwise determined by the Committee, the following events shall not be deemed a termination of employment: (a) a transfer of a Participant's employment to the Company from a Subsidiary or from the Company to a Subsidiary, or from one Subsidiary to another; or (b) an approved leave of absence for military service or sickness, or for any other purpose approved by the Company, if the employee's right to re-employment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Committee otherwise so provides in writing.

15. General Provisions.

15.1 *Status of Plan.* The Committee may authorize the creation of trusts or other arrangements to meet the Company's obligations to deliver stock or make payments with respect to Awards.

15.2 *Award Agreement.* Each Award under the Plan shall be evidenced by an Award Agreement in a written or electronic form approved by the Committee setting forth the number of shares of Common Stock or Restricted Stock Units subject to the Award, the exercise price, base price or purchase price of the Award, the time or times at which an Award will become vested, exercisable or payable and the term of the Award. The Award Agreement also may set forth the effect on an Award of a Change in Control or a termination of Service under certain circumstances. The Award Agreement shall be subject to and incorporate, by reference or otherwise, all of the applicable terms and conditions of the Plan, and also may set forth other terms and conditions applicable to the Award as determined by the Committee consistent with the limitations of the Plan. The grant of an Award under the Plan shall not confer any rights upon the Participant holding such Award other than such terms, and subject to such conditions, as are specified in the Plan as being applicable to such type of Award (or to all Awards) or as are expressly set forth in the Award Agreement. The Committee need not require the execution of an Award Agreement by a Participant, in which case, acceptance of the Award by the Participant shall constitute agreement by the Participant to the terms, conditions, restrictions and limitations set forth in the Plan and the Award Agreement as well as the administrative guidelines of the Company in effect from time to time. In the event of any conflict between the provisions of the Plan and any Award Agreement, the provisions of the Plan shall prevail.

15.3 *No Assignment or Transfer; Beneficiaries.* Except as provided in Section 6.7(e) hereof or as otherwise determined by the Committee, Awards under the Plan shall not be assignable or transferable by the Participant, and shall not be subject in any manner to assignment, alienation, pledge, encumbrance or charge. Notwithstanding the foregoing, in the event of the death of a Participant, except as otherwise provided by the Committee in an Award Agreement, an outstanding Award may be exercised by or shall become payable to the Participant's beneficiary as designated by the Participant in the manner prescribed by the Committee or, in the absence of an authorized beneficiary designation, by a legatee or legatees of such Award under the Participant's last will or by such Participant's executors, personal representatives or distributees of such Award in accordance with the Participant's will or the laws of descent and distribution. The Committee may provide in the terms of an Award Agreement or in any other manner prescribed by the Committee that the Participant shall have the right to designate a beneficiary or beneficiaries who shall be entitled to any rights, payments or other benefits specified under an Award following the Participant's death.

15.4 *Deferrals of Payment.* The Committee may in its discretion permit a Participant to defer the receipt of payment of cash or delivery of shares of Common Stock that would otherwise be due to the Participant by virtue of the exercise of a right or the satisfaction of vesting or other conditions with respect to an Award; provided, however, that such discretion shall not apply in the case of a Stock Option or Stock Appreciation Right. If any such deferral is to be permitted by the Committee, the Committee shall establish rules and procedures relating to such deferral in a manner intended to comply with the requirements of Section 409A of the Code, including, without limitation, the time when an election to defer may be made, the time period of the deferral and the events that would result in payment of the deferred amount, the interest or other earnings attributable to the deferral and the method of funding, if any, attributable to the deferred amount.

15.5 *No Right to Employment or Continued Service.* Nothing in the Plan, in the grant of any Award or in any Award Agreement shall confer upon any Eligible Person or any Participant any right to continue in the Service of the Company or any of its Subsidiaries or interfere in any way with the right of the Company or any of its Subsidiaries to terminate the employment or other service relationship of an Eligible Person or a Participant for any reason at any time. The loss of existing or potential profit from an Award will not constitute an element of damages in the event of a termination of Service for any reason, even if the termination is in violation of an obligation of the Company or any affiliate.

15.6 *Stock Certificates.* The Committee may determine in its discretion the manner of delivery of Common Stock to be issued under the Plan, which may be by delivery of stock certificates, electronic account entry into new or existing accounts or any other means as the Committee, in its discretion, deems appropriate. The Committee may require that the stock certificates (if any) be held in escrow by the Company for any shares of Common Stock or cause the shares to be legended in order to comply with the securities laws or other applicable restrictions or should the shares of Common Stock be represented by book or electronic account entry rather than a certificate, the Committee may take such steps to restrict transfer of the shares of Common Stock as the Committee considers necessary or advisable.

15.7 *Trading Policy Restrictions.* Option exercises and other Awards under the Plan shall be subject to such Company insider-trading-policy-related restrictions, terms and conditions to the extent established by the Committee, or in accordance with policies set by the Committee, from time to time.

15.8 *Section 409A Compliance.* To the maximum extent possible, it is intended that the Plan and all Awards hereunder comply with, or be exempt from, the requirements of Section 409A of the Code and the Treasury Regulations and other guidance issued thereunder, and that the Plan and all Award Agreements shall be interpreted and applied by the Committee in a manner consistent with this intent in order to avoid the imposition of any additional tax under Section 409A of the Code. Subject to Section 15.4 hereof, any payments due pursuant to this Plan shall be payable to the Participant no later than two-and-a-half months following the end of the taxable year in which the payments are earned (subject to a reasonable delay in payment due

to an unforeseeable event making it administratively impracticable to make the payment by such time), and in no event shall the payments be made later than the end of the taxable year following the taxable year in which the payments are earned. In the event that any payment under this Plan is contingent upon the execution of a release, and the applicable release spans two of the Participant's taxable years, the applicable payments must be made in the second of the two taxable years. For purposes of Section 409A, each payment made under this Plan will be treated as a separate payment. In the event that any (i) provision of the Plan or an Award Agreement, (ii) Award, payment, transaction or (iii) other action or arrangement contemplated by the provisions of the Plan is determined by the Committee to not comply with the applicable requirements of Section 409A of the Code and the Treasury Regulations and other guidance issued thereunder, the Committee shall have the authority to take such actions and to make such changes to the Plan or an Award Agreement as the Committee deems necessary to comply with such requirements. No payment that constitutes deferred compensation under Section 409A of the Code that would otherwise be made under the Plan or an Award Agreement upon a termination of Service will be made or provided unless and until such termination is also a "separation from service," as determined in accordance with Section 409A of the Code (after giving effect to the presumptions contained therein). Notwithstanding the foregoing or anything elsewhere in the Plan or an Award Agreement to the contrary, if a Participant is a "specified employee" as defined in Section 409A of the Code at the time of termination of Service with respect to an Award, then solely to the extent necessary to avoid the imposition of any additional tax under Section 409A of the Code, the commencement of any payments or benefits under the Award shall be deferred until the date that is six (6) months following the Participant's termination of Service (or, if earlier, the date of death of the specified employee) and shall instead be paid (in a manner set forth in the Award Agreement) on the payment date that immediately follows the end of such six (6) month period (or death) or as soon as administratively practicable within thirty (30) days thereafter, but in no event later than the end of the applicable taxable year.

15.9 No Guarantees Regarding Tax Treatment; Limitation of Liability: Neither the Company nor the Committee make any guarantees to any person regarding the tax treatment of Awards or payments made under the Plan. Neither the Company nor the Committee has any obligation to take any action to prevent the assessment of any tax on any person with respect to any Award under Section 422 of the Code, Section 409A of the Code, Section 4999 of the Code, Section 280G of the Code or otherwise. Notwithstanding anything to the contrary in the Plan, in no event whatsoever shall the Company, any of its Subsidiaries, the Committee, or any person acting on behalf of the Company, any of its Subsidiaries, or the Committee, be liable to any Participant, to any permitted transferee, to the estate or beneficiary of any Participant or any permitted transferee, or to any other person by reason of or with respect to any acceleration of income, or any additional tax, interest or penalties or damages that are asserted by reason of the failure of an Award to satisfy the requirements of Section 422 or Section 409A of the Code, or by reason of Section 4999 of the Code, or otherwise asserted with respect to an Award.

15.10 Securities Law Compliance. No shares of Common Stock will be issued or transferred pursuant to an Award unless and until all then applicable requirements imposed by Federal and state securities and other laws, rules and regulations and by any regulatory agencies having jurisdiction, and by any exchanges upon which the shares of Common Stock may be listed, have been fully met. As a condition precedent to the issuance of shares pursuant to the

grant or exercise of an Award, the Company may require the Participant to take any reasonable action to meet such requirements. The Committee may impose such conditions on any shares of Common Stock issuable under the Plan as it may deem advisable, including, without limitation, restrictions under the Securities Act, under the requirements of any exchange upon which such shares of the same class are then listed, and under any blue sky or other securities laws applicable to such shares. The Committee may also require the Participant to represent and warrant at the time of issuance or transfer that the shares of Common Stock are being acquired only for investment purposes and without any current intention to sell or distribute such shares.

15.11 *Substitute Awards in Corporate Transactions.* Nothing contained in the Plan shall be construed to limit the right of the Committee to grant Awards under the Plan in connection with the acquisition, whether by purchase, merger, consolidation or other corporate transaction, of the business or assets of any corporation or other entity. Without limiting the foregoing, the Committee may grant Awards under the Plan to an employee, director or other individual service provider of another corporation who becomes an Eligible Person by reason of any such corporate transaction in substitution for awards previously granted by such corporation or entity to such person. The terms and conditions of the substitute Awards may vary from the terms and conditions that would otherwise be required by the Plan solely to the extent the Committee deems necessary for such purpose. To the extent consistent with the rules of NYSE or other principal exchange on which the Common Stock is then listed, any such substitute awards shall not (a) reduce the number of shares of Common Stock available for issuance under the Plan, (b) be subject to or counted against the Award limits specified in Section 4.3, 4.4 or 10.6 hereof or (c) replenish the Share Reserve upon the occurrence of any event set forth in Section 4.2 hereof.

15.12 *Tax Withholding.* The Company shall have the power and the right to deduct or withhold automatically from any amount deliverable under the Award or otherwise, or require a Participant to remit to the Company or the applicable Subsidiary, up to an amount based on the maximum statutory tax rates in the Participant's applicable tax jurisdiction or such other rate that will not trigger a negative accounting impact on the Company. With respect to required withholding, Participants may elect (subject to the Company's automatic withholding right set out above) to satisfy the withholding requirement with respect to any taxable event arising as a result of the Plan, in whole or in part, by the methods described in Section 6.5 hereof with respect to Stock Options or by a method similar to the methods described in Section 6.5 hereof with respect to Awards other than Stock Options (except as otherwise set forth in an Award Agreement), subject, in each case, to the Committee's discretion as set forth in such Section 6.5.

15.13 *Unfunded Plan.* The adoption of the Plan and any reservation of shares of Stock or cash amounts by the Company to discharge its obligations hereunder shall not be deemed to create a trust or other funded arrangement. Except upon the issuance of Common Stock pursuant to an Award, any rights of a Participant under the Plan shall be those of a general unsecured creditor of the Company, and neither a Participant nor the Participant's permitted transferees or estate shall have any other interest in any assets of the Company by virtue of the Plan. Notwithstanding the foregoing, the Company shall have the right to implement or set aside funds in a grantor trust, subject to the claims of the Company's creditors or otherwise, to discharge its obligations under the Plan. The Plan is not subject to the U.S. Employee Retirement Income Security Act of 1974, as amended from time to time.

15.14 *Other Compensation and Benefit Plans.* The adoption of the Plan shall not affect any other share incentive or other compensation plans in effect for the Company or any Subsidiary, nor shall the Plan preclude the Company or any Subsidiary from establishing any other forms of share incentive or other compensation or benefit program for employees of the Company or any Subsidiary. The amount of any compensation deemed to be received by a Participant pursuant to an Award shall not constitute includable compensation for purposes of determining the amount of benefits to which a Participant is entitled under any other compensation or benefit plan or program of the Company or a Subsidiary, including, without limitation, under any pension or severance benefits plan, except to the extent specifically provided by the terms of any such plan.

15.15 *Plan Binding on Transferees.* The Plan shall be binding upon the Company, its transferees and assigns, and the Participant, the Participant's executor, administrator and permitted transferees and beneficiaries.

15.16 *Severability.* If any provision of the Plan or any Award Agreement shall be determined to be illegal or unenforceable by any court of law in any jurisdiction, the remaining provisions hereof and thereof shall be severable and enforceable in accordance with their terms, and all provisions shall remain enforceable in any other jurisdiction.

15.17 *Governing Law.* The Plan and all rights hereunder shall be subject to and interpreted in accordance with the laws of the State of Delaware, without reference to the principles of conflicts of laws, and to applicable Federal securities laws.

15.18 *Consent to Jurisdiction.* By accepting an Award, each Participant will be deemed to have submitted irrevocably and unconditionally to the jurisdiction and venue of the federal and state courts located within the geographic boundaries of the United States District Court for the Eastern District of Pennsylvania relative to any and all disputes, claims, suits, actions or other proceedings that may arise out of or relate to this Plan, an Award or any related Award Agreement. Further, by accepting an Award, each Participant will be deemed to agree (a) not to commence any suits, actions or other proceeding arising out of or related to this Plan, an Award or any related Award Agreement, except in the federal and state courts located within the geographic boundaries of the United States District Court for the Eastern District of Pennsylvania, and (b) to waive, and agree not to assert, by way of motion as a defense or otherwise, in any such suit, action or proceeding, any claim that he or she is not subject personally to the jurisdiction of the above-named courts that his or her property is exempt or immune from attachment or execution, that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that the Plan or an Award or the subject matter thereof may not be enforced in or by such court.

15.19 *Waiver of Jury Trial.* By accepting or being deemed to have accepted an Award under this Plan, each Participant waives any right to a jury trial in any action, proceeding or counterclaim arising under or in connection with or concerning any rights under the Plan and any Award, or under any amendment, waiver, consent, instrument, document or other agreement delivered or which in the future may be delivered in connection therewith, and agrees that any such action, proceedings or counterclaim will be tried before a court and not before a jury. By accepting or being deemed to have accepted an Award under the Plan, each Participant certifies

that no officer, representative, or attorney of the Company has represented, expressly or otherwise, that the Company would not, in the event of any action, proceeding or counterclaim, seek to enforce the foregoing waivers. Notwithstanding anything to the contrary in the Plan, nothing herein is to be construed as limiting the ability of the Company and a Participant to agree to submit disputes arising under the terms of the Plan or any Award made hereunder to binding arbitration or as limiting the ability of the Company to require any eligible individual to agree to submit such disputes to binding arbitration as a condition of receiving an Award hereunder.

15.20 *No Fractional Shares.* No fractional shares of Common Stock shall be issued or delivered pursuant to the Plan or any Award, and the Committee shall determine (i) whether cash, other securities or other property shall be paid or transferred in lieu of any fractional shares of Common Stock or (ii) whether such fractional shares or any rights thereto shall be canceled, terminated or otherwise eliminated (in the case of this clause (ii), with no consideration paid therefor).

15.21 *Data Protection.* By participating in the Plan, each Participant consents to the collection, processing, transmission and storage by the Company, its Subsidiaries and any third party administrators of any data of a professional or personal nature for the purposes of administering the Plan.

15.22 *Awards to Non-U.S. Participants.* To comply with the laws in countries other than the United States in which the Company or any of its Subsidiaries or affiliates operates or has employees, Non-Employee Directors or consultants, the Committee, in its sole discretion, shall have the power and authority to (i) modify the terms and conditions of any Award granted to Participants outside the United States to comply with applicable foreign laws, (ii) take any action, before or after an Award is made, that it deems advisable to obtain approval or comply with any necessary local government regulatory exemptions or approvals and (iii) establish subplans and modify exercise procedures and other terms and procedures, to the extent such actions may be necessary or advisable. Any subplans and modifications to Plan terms and procedures established under this Section 15.22 by the Committee shall be deemed to be part of the Plan but will apply only to Eligible Persons within the group to which the supplement applies (as determined by the Committee).

15.23 *No Rights as Stockholder.* A Participant shall not have any rights as a stockholder with respect to any shares subject to an Award until such time as shares of Common Stock are delivered to the Participant pursuant to the terms of the applicable Award Agreement.

16. Term; Amendment and Termination; Stockholder Approval.

16.1 *Term.* The Plan shall be effective as of the date of adoption by the Board, which date is set forth below (the "*Effective Date*"). Subject to Section 16.2 hereof, the Plan shall terminate on the tenth anniversary of the Effective Date.

16.2 *Amendment and Termination.* The Board may from time to time and in any respect, amend, modify, suspend or terminate the Plan; provided, that, except as otherwise provided in Section 15.8 or 15.20 or as otherwise determined by the Committee as it deems necessary to comply with applicable laws, no amendment, modification, suspension or

termination of the Plan shall adversely affect any Award theretofore granted without the consent of the Participant or the permitted transferee of the Award. The Board may seek the approval of any amendment, modification, suspension or termination by the Company's stockholders to the extent it deems necessary or advisable in its discretion for purposes of compliance with Section 162(m) or Section 422 of the Code, the listing requirements of NYSE or any other exchange or securities market or for any other purpose, in each case, to the extent applicable.

16.3 *Stockholder Approval.* The Plan will be submitted for approval by the stockholders of the Company within twelve months of the Effective Date. Any Awards granted under the Plan prior to such approval of the stockholders shall be effective as of the applicable Date of Grant, but no such Award may be exercised or settled and no restrictions relating to any Award may lapse prior to such stockholder approval, and if the stockholders fail to approve the Plan as specified hereunder, the Plan and any Awards issued thereunder shall be terminated and cancelled without consideration.

16.4 *Re-Approval of Performance Criteria.* At the discretion of the Board, for purposes of compliance with Section 162(m) of the Code, the Company may seek approval by the Company's stockholders of the Performance Criteria (or other designated performance goals) and such other provisions as determined by the Board no later than the Annual General Meeting of Stockholders that occurs in the third year following the year in which a Public Offering first occurs.

* * * *

This Plan was duly adopted and approved by the Board by resolution at a meeting held on _____, 2017.

**PQ GROUP HOLDINGS INC.
2017 Omnibus Incentive Plan**

Stock Option Award Agreement

This Stock Option Award Agreement (this "*Agreement*") is made by and between PQ Group Holdings Inc., a Delaware corporation (the "*Company*"), and [•] (the "*Participant*"), effective as of [•] (the "*Date of Grant*").

RECITALS

WHEREAS, the Company has adopted the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan (as the same may be amended and/or amended and restated from time to time, the "*Plan*"), which Plan is incorporated herein by reference and made a part of this Agreement, and capitalized terms not otherwise defined in this Agreement will have the meanings ascribed to those terms in the Plan; and

WHEREAS, the Committee has authorized and approved the grant of an Award to the Participant of a Stock Option to purchase shares of Common Stock ("*Shares*"), subject to the terms and conditions set forth in the Plan and this Agreement.

NOW THEREFORE, in consideration of the premises and mutual covenants set forth in this Agreement, the parties agree as follows:

1. **Grant of Stock Option Award.** On the Date of Grant, the Company has granted to the Participant the right and option to purchase, on the terms and conditions set forth in the Plan and this Agreement, all or any part of an aggregate of [•] Shares, subject to adjustment as set forth in the Plan (the "*Option*"). The Option is intended to be a Nonqualified Stock Option.
2. **Exercise Price.** The exercise price of the Option is \$[•] per Share, subject to adjustment as set forth in the Plan (the "*Exercise Price*").
3. **Vesting of Option.** Subject to the terms and conditions set forth in the Plan and this Agreement, and except as otherwise provided in Section 4, the Option will vest [], subject to the Participant's continued Service through each applicable vesting date.
4. **Forfeiture; Expiration.**
 - (a) **Termination of Service.** Any unvested portion of the Option will be forfeited immediately, automatically and without consideration upon a termination of the Participant's Service for any reason. In the event the Participant's Service is terminated for Cause, the vested portion of the Option will also be forfeited immediately, automatically and without consideration upon that termination for Cause. Without limiting the generality of the foregoing, the Option and the Shares (and any resulting proceeds) will continue to be subject to Section 13 of the Plan.

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- (b) Expiration. Any unexercised portion of the Option will expire on the tenth (10th) anniversary of the Date of Grant (the “*Expiration Date*”), or earlier as provided in this Agreement (including Section 5) or the Plan.
5. Period of Exercise. Subject to the provisions of the Plan and this Agreement, the Participant may exercise all or any part of the vested portion of the Option at any time prior to the earliest to occur of:
- (a) the Expiration Date;
 - (b) the date that is one (1) year following termination of the Participant’s Service due to death or Disability;
 - (c) the date of termination of the Participant’s Service for Cause; or
 - (d) the date that is ninety (90) days following the termination of the Participant’s Service for any reason other than pursuant to Sections 5(b) or 5(c) above.
6. Exercise of Option
- (a) Notice of Exercise. Subject to Sections 4 and 5, the Participant or, in the case of the Participant’s death or Disability, the Participant’s representative may exercise all or any part of the vested portion of the Option by delivering to the Company at its principal office a written notice of exercise in the form attached as Exhibit A or any other form that the Committee may permit (such notice, a “*Notice of Exercise*”). The Notice of Exercise will be signed by the person exercising the Option. In the event that the Option is being exercised by the Participant’s representative, the Notice of Exercise will be accompanied by proof (satisfactory to the Committee) of the representative’s right to exercise the Option. The Participant or the Participant’s representative will deliver to the Committee, at the time of giving the Notice of Exercise, payment in a form permissible under Section 7 for the full amount of the Purchase Price (as defined below) and applicable withholding taxes as provided below.
 - (b) Issuance of Shares. After all requirements with respect to the exercise of the Option have been satisfied, the Committee will cause to be issued the Shares as to which the Option has been exercised (or, in the Committee’s discretion, in un-certificated form, upon the books of the Company’s transfer agent), registered in the name of the person exercising the Option (or in the names of such person and his or her spouse as community property or as joint tenants with right of survivorship). Neither the Company nor the Committee will be liable to the Participant or any other Person for damages relating to any delays in issuing the Shares or any mistakes or errors in the issuance of the Shares.
 - (c) Withholding Requirements. The Company will have the power and the right to deduct or withhold automatically from any Shares deliverable under this Agreement or from any other compensation payable to the Participant, or to require the Participant or the Participant’s representative to remit to the Company,

up to the maximum statutory amount necessary to satisfy federal, state and local taxes, domestic or foreign, required by law or regulation to be withheld with respect to any taxable event arising as a result of this Agreement (collectively, “*Withheld Taxes*”); provided that any obligations to pay Withheld Taxes may be satisfied in the manner in which the Purchase Price is permitted to be paid under Section 7 or any other manner permitted by the Plan. Nothing in this Agreement may be construed as relieving the Participant of his or her obligation to satisfy all taxes required to be withheld in connection with the granting or exercise of the Option.

7. Payment for Shares. The “*Purchase Price*” will be the Exercise Price multiplied by the number of Shares with respect to which the Option is being exercised. Subject to compliance with applicable law and the Company’s insider trading or other similar policy, all or part of the Purchase Price and any Withheld Taxes may be paid as follows:
- (a) Cash or Check. In cash or by bank certified check.
 - (b) Brokered Cashless Exercise. To the extent permitted by applicable law and unless otherwise provided by the Committee, from the proceeds of a sale through a broker on the date of exercise of some or all of the Shares to which the exercise relates. In that case, the Participant will provide the Company a properly executed Notice of Exercise, together with a copy of irrevocable instructions to a broker to deliver promptly to the Company the amount of sale proceeds to pay the aggregate purchase price and/or Withheld Taxes, as applicable. To facilitate the foregoing, the Company may, to the extent permitted by applicable law, enter into agreements or coordinate procedures with one or more brokerage firms.
 - (c) Net Exercise. By reducing the number of Shares otherwise deliverable upon the exercise of the Option by the number of Shares having a Fair Market Value equal to the amount of the Purchase Price and/or Withheld Taxes, as applicable.
 - (d) Surrender of Stock. In each instance, at the sole discretion of the Committee, by surrendering, or attesting to the ownership of, Shares that are already owned by the Participant free and clear of any restriction or limitation, unless the Committee specifically agrees to accept such Shares subject to such restriction or limitation. Such Shares will be surrendered to the Company in good form for transfer and will be valued by the Company at their Fair Market Value on the date of the applicable exercise of the Option, or to the extent applicable, on the date the Withheld Taxes are to be determined. The Participant will not surrender, or attest to the ownership of, Shares in payment of the Purchase Price (or Withheld Taxes) if such action would cause the Company to recognize compensation expense (or additional compensation expense) with respect to this Option for financial reporting purposes that otherwise would not have occurred.
8. Adjustment to Option. In the event of any change with respect to the outstanding shares of Common Stock contemplated by Section 4.5 of the Plan, the Option may be adjusted by the Committee in accordance with Section 4.5 of the Plan.

9. Miscellaneous Provisions

- (a) Securities Laws Requirements. No Shares will be issued or transferred pursuant to this Agreement unless and until all then applicable requirements imposed by federal and state securities and other laws, rules and regulations and by any regulatory agencies having jurisdiction, and by any exchanges upon which the Shares may be listed, have been fully met. As a condition precedent to the issuance of Shares pursuant to this Agreement, the Company may require the Participant to take any reasonable action to meet those requirements. The Committee may impose such conditions on any Shares issuable pursuant to this Agreement as it may deem advisable, including, without limitation, restrictions under the Securities Act, under the requirements of any exchange upon which shares of the same class are then listed and under any blue sky or other securities laws applicable to those Shares.
- (b) Rights of a Shareholder of the Company. Neither the Participant nor the Participant's representative will have any rights as a shareholder of the Company with respect to any Shares subject to the Option until the Participant or the Participant's representative becomes entitled to receive those Shares by (i) filing a Notice of Exercise, (ii) paying the Purchase Price and Withheld Taxes as provided in this Agreement, and the Company actually receiving those amounts, (iii) the Company issuing those Shares and entering the name of the Participant in the register of shareholders of the Company as the registered holder of those Shares and (iv) satisfying any other conditions as the Committee reasonably requires.
- (c) Transfer Restrictions. The Option may not be transferred except as expressly permitted under Section 15.3 of the Plan. The Shares purchased by exercise of the Option will be subject to such stop transfer orders and other restrictions as the Committee may deem advisable under the Plan or the rules, regulations and other requirements of the Securities and Exchange Commission, any stock exchange upon which such shares are listed, any applicable federal or state laws and any agreement with, or policy of, the Company or the Committee to which the Participant is a party or subject, and the Committee may cause orders or designations to be placed upon the books and records of the Company's transfer agent to make appropriate reference to such restrictions.
- (d) No Right to Continued Service. Nothing in this Agreement or the Plan confers upon the Participant any right to continue in Service for any period of specific duration or interfere with or otherwise restrict in any way the rights of the Company (or any Subsidiary employing or retaining the Participant) or of the Participant, which rights are hereby expressly reserved by each, to terminate his or her Service at any time and for any reason, with or without Cause.
- (e) Notification. Any notification required by the terms of this Agreement will be given by the Participant (i) in a writing addressed to the Company at its principal executive office and will be deemed effective upon actual receipt when delivered by personal delivery or by registered or certified mail, with postage and fees

prepaid, or (ii) by electronic transmission to the Company's e-mail address of the Company's General Counsel and will be deemed effective upon actual receipt. Any notification required by the terms of this Agreement will be given by the Company (x) in a writing addressed to the address that the Participant most recently provided to the Company and will be deemed effective upon personal delivery or within three (3) days of deposit with the United States Postal Service, by registered or certified mail, with postage and fees prepaid, or (y) by facsimile or electronic transmission to the Participant's primary work fax number or e-mail address (as applicable) and will be deemed effective upon confirmation of receipt by the sender of such transmission.

- (f) Entire Agreement. This Agreement and the Plan constitute the entire agreement between the parties hereto with regard to the subject matter of this Agreement. This Agreement and the Plan supersede any other agreements, representations or understandings (whether oral or written and whether express or implied) that relate to the subject matter of this Agreement.
- (g) Waiver. No waiver of any breach or condition of this Agreement will be deemed to be a waiver of any other or subsequent breach or condition whether of like or different nature.
- (h) Successors and Assigns. The provisions of this Agreement will inure to the benefit of, and be binding upon, the Company and its successors and assigns and upon the Participant, the Participant's executor, personal representative(s), distributees, administrator, permitted transferees, permitted assignees, beneficiaries, and legatee(s), as applicable, whether or not any such person will have become a party to this Agreement and have agreed in writing to be joined herein and be bound by the terms hereof.
- (i) Severability. The provisions of this Agreement are severable, and if any one or more provisions are determined to be illegal or otherwise unenforceable, in whole or in part, then the remaining provisions will nevertheless be binding and enforceable.
- (j) Choice of Law; Jurisdiction. This Agreement and all claims, causes of action or proceedings (whether in contract, in tort, at law or otherwise) that may be based upon, arise out of or relate to this Agreement will be governed by the laws of the State of Delaware, excluding any conflicts or choice-of-law rule or principle that might otherwise refer construction or interpretation of this Agreement to the substantive law of another jurisdiction. The Participant agrees that he or she will bring all claims, causes of action and proceedings (whether in contract, in tort, at law or otherwise) that may be based upon, arise out of or be related to the Plan and this Agreement exclusively in the federal and state courts located within the geographic boundaries of the United States District Court for the Eastern District of Pennsylvania (the "*Chosen Court*"), and hereby (i) irrevocably submits to the

exclusive jurisdiction of the Chosen Court, (ii) waives any objection to laying venue in any such proceeding in the Chosen Court, (iii) waives any objection that the Chosen Court is an inconvenient forum or does not have jurisdiction over any party and (iv) agrees that service of process upon such party in any such claim or cause of action will be effective if notice is given in accordance with this Agreement.

- (k) Signature in Counterparts. This Agreement may be signed in counterparts, manually or electronically, each of which will be an original, with the same effect as if the signatures to each were upon the same instrument.
- (l) Acceptance. The Participant hereby acknowledges receipt of a copy of the Plan and this Agreement. The Participant has read and understands the terms and provisions of the Plan and this Agreement, and accepts the Option subject to all of the terms and conditions of the Plan and this Agreement. In the event of a conflict between any term or provision contained in this Agreement and a term or provision of the Plan, the applicable term and provision of the Plan will govern and prevail.

[Signature page follows.]

IN WITNESS WHEREOF, the Company and the Participant have executed this Stock Option Award Agreement as of the Date of Grant.

PARTICIPANT

PQ GROUP HOLDINGS INC.

By: _____

[Signature Page – Stock Option Award Agreement]

EXHIBIT A

NOTICE OF EXERCISE

PQ Group Holdings Inc.
[Address 1]
[Address 2]
Attention: General Counsel

Date of Exercise: _____

Ladies & Gentlemen:

1. *Exercise of Option.* This constitutes notice to PQ Group Holdings Inc. (the “Company”) that, pursuant to my PQ Group Holdings Inc. 2017 Omnibus Incentive Plan Stock Option Award Agreement, dated _____, 20____ (the “Award Agreement”), I elect to purchase the number of Shares set forth below for the price set forth below. Capitalized terms used and not otherwise defined in this notice will have the meanings ascribed to those terms in the Award Agreement. By signing and delivering this notice to the Company, I hereby acknowledge that I am the holder of the Option exercised by this notice and have full power and authority to exercise the Option.

Number of Shares as to which Option is exercised (“Optioned Shares”): _____

Shares to be issued in name of: _____

Date of Grant: _____

Total Purchase Price: _____

2. *Delivery of Payment.* With this notice, I hereby deliver to the Company the full exercise price of the Optioned Shares and any and all Withheld Taxes due in connection with the exercise of my Option, subject to satisfaction of the Purchase Price and any and all Withheld Taxes in any other manner consistent with the Award Agreement and the Plan.

3. *Rights as Stockholder.* While the Company will endeavor to process this notice in a timely manner, I acknowledge that, until the issuance of the Optioned Shares (or, in the Committee’s discretion, in un-certificated form, upon the books of the Company’s transfer agent) and my satisfaction of any other conditions imposed by the Committee pursuant to the Plan or as set forth in the Award Agreement, no right to vote or receive dividends or any other rights as a stockholder will exist with respect to the Optioned Shares, notwithstanding the exercise of my Option. No adjustment will be made for a dividend or other right for which the record date is prior to the date of issuance of the Optioned Shares.

4. *Interpretation.* Any dispute regarding the interpretation of this notice will be submitted promptly by me or by the Company to the Committee. The resolution of such a dispute by the Committee will be final and binding on all parties.

5. *Entire Agreement.* The Plan and the Award Agreement under which the Optioned Shares were granted are incorporated herein by reference and, together with this notice, constitute the entire agreement of the parties with respect to the subject matter of this notice.

Very truly yours,

Signature: _____

Name: _____

Address: _____

Social Security Number: _____

**PQ GROUP HOLDINGS INC.
2017 Omnibus Incentive Plan**

Restricted Stock Award Agreement

This Restricted Stock Award Agreement (this "*Agreement*") is made by and between PQ Group Holdings Inc., a Delaware corporation (the "*Company*"), and [•] (the "*Participant*"), effective as of [•] (the "*Date of Grant*").

RECITALS

WHEREAS, the Company has adopted the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan (as the same may be amended and/or amended and restated from time to time, the "*Plan*"), which Plan is incorporated herein by reference and made a part of this Agreement, and capitalized terms not otherwise defined in this Agreement will have the meanings ascribed to those terms in the Plan; and

WHEREAS, the Committee has authorized and approved the grant of an Award to the Participant of restricted Common Stock ("*Restricted Stock*"), subject to the terms and conditions set forth in the Plan and this Agreement.

NOW THEREFORE, in consideration of the premises and the mutual covenants set forth in this Agreement, the parties agree as follows:

1. Grant of Restricted Stock Award. The Company has granted to the Participant, effective as of the Date of Grant, [•] shares of Restricted Stock, on the terms and conditions set forth in the Plan and this Agreement, subject to adjustment as set forth in the Plan.
2. Vesting of Restricted Stock. Subject to the terms and conditions set forth in the Plan and this Agreement, and except as otherwise provided in Section 3, the shares of Restricted Stock will vest [], subject to the Participant's continued Service through the applicable vesting date.
3. Forfeiture. Any unvested shares of Restricted Stock will be forfeited immediately, automatically and without consideration upon a termination of the Participant's Service for any reason. Without limiting the generality of the foregoing, the shares of Restricted Stock and any vested shares (and any resulting proceeds) will continue to be subject to Section 13 of the Plan.
4. Issuance of Shares.
 - (a) Book-Entry Registration of the Shares; Delivery of Shares. The Company may at its election either: (i) after the Date of Grant, issue a certificate representing the shares of Restricted Stock subject to this Agreement and place a legend and stop transfer notice on that certificate, in which case the Company may retain that certificate unless, until and as any shares represented by that certificate have vested and may cancel that certificate if and to the extent that the shares of Restricted Stock are forfeited or otherwise required to be transferred back to the

Company; provided that, if the shares of Restricted Stock are to be certificated, the Company may require the Participant to deliver to the Company a duly-executed blank stock power in a form to be provided by the Company; or (ii) not issue any certificate representing the shares of Restricted Stock subject to this Agreement and instead document the Participant's interest in the shares of Restricted Stock by registering the shares of Restricted Stock with the Company's transfer agent (or another custodian selected by the Company) in book-entry form in the Participant's name with the applicable restrictions noted in the book entry system, in which case no certificate representing all or any part of the shares of Restricted Stock will be issued unless, until and as any of those shares have vested, and the Company may cancel those book entry shares if and to the extent that the shares of Restricted Stock are forfeited or otherwise required to be transferred back to the Company. In any case, the Company may provide a reasonable delay in the issuance or delivery of vested shares of Common Stock hereunder to address withholding taxes and other administrative matters. The Participant hereby appoints the Company as his or her attorney-in-fact to take such actions as may be necessary or appropriate to effectuate this Section 4.

- (b) Shareholder Rights. The Participant will have the rights of a stockholder with respect to the shares of Restricted Stock, including any voting rights and the right to receive dividends or other distributions with respect to shares of Restricted Stock; provided, however, that (x) any regular cash dividends paid with respect to an unvested share of Restricted Stock (the "*associated share*") will be withheld by the Company and will be paid to the Participant, without interest, within thirty (30) days after the associated share vests and will be forfeited if and when the associated share is forfeited, and (y) any property (other than cash) distributed with respect to an associated share (including without limitation a distribution of shares by reason of a stock dividend, stock split or otherwise or a distribution of other securities with respect to an associated share) will be subject to the restrictions of this Agreement in the same manner and for so long as the associated share remains subject to those restrictions and will be forfeited if and when the associated share is forfeited or will vest if and when the associated share vests.
- (c) Withholding Requirements. [As a condition to the grant and vesting of the Restricted Stock, the Participant will make such arrangements as the Committee may require for the satisfaction of any federal, state, local or foreign withholding tax obligations that may arise in connection with the shares of Restricted Stock. The Participant may elect to satisfy such obligations in cash or, in the Committee's discretion, by having the Company withhold a number of shares of vested Restricted Stock having a Fair Market Value equal to such obligation. Nothing in this Agreement may be construed as relieving the Participant of his or her obligation to satisfy all taxes required to be withheld in connection with the grant or vesting of the Restricted Stock.]¹ [The Participant is responsible for satisfying and paying all taxes arising from or due in connection with the award, vesting or payments under this award of Restricted Stock. The Company will have no liability or obligation related to the foregoing.]²

¹ To be used if the Participant is an employee.

² To be used if the Participant is a non-employee director.

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5. Adjustment to Restricted Stock. In the event of any change with respect to the outstanding shares of Common Stock contemplated by Section 4.5 of the Plan, the Restricted Stock may be adjusted by the Committee in accordance with Section 4.5 of the Plan.
6. Miscellaneous Provisions.
- (a) Securities Laws Requirements. No shares of Common Stock will be issued or transferred pursuant to this Agreement unless and until all then applicable requirements imposed by federal and state securities and other laws, rules and regulations and by any regulatory agencies having jurisdiction, and by any exchanges upon which the shares of Common Stock may be listed, have been fully met. As a condition precedent to the issuance of shares of Common Stock pursuant to this Agreement, the Company may require the Participant to take any reasonable action to meet those requirements. The Committee may impose such conditions on any shares of Common Stock issuable pursuant to this Agreement as it may deem advisable, including, without limitation, restrictions under the Securities Act, under the requirements of any exchange upon which shares of the same class are then listed and under any blue sky or other securities laws applicable to those shares of Common Stock.
- (b) Section 83(b) Election. The Participant may file an election pursuant to Section 83(b) of the Code with respect to the Restricted Stock, provided that the Participant has made such arrangements as the Committee may require for the satisfaction of any federal, state, local or foreign withholding tax obligations with respect to the transfer of shares of Restricted Stock in cash, upon the filing of such election. If the Participant makes an election pursuant to Section 83(b) of the Code, the Participant will file, within thirty (30) days following the Date of Grant, a copy of such election with the Company and with the Internal Revenue Service, in accordance with the regulations under Section 83 of the Code. The Participant acknowledges that it is his or her sole responsibility, and not the Company's, to file a timely election under Section 83(b) of the Code, even if the Participant requests that the Company or its representatives make this filing on his or her behalf. The Participant has been advised to confer promptly with a professional tax advisor to consider whether he or she should make the election described herein. The Company has made no recommendation to the Participant with respect to the advisability of making such an election

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- (c) Non-Transferability. The shares of Restricted Stock may not be transferred except as expressly permitted under Section 15.3 of the Plan. Any shares of Common Stock delivered hereunder will be subject to such stop transfer orders and other restrictions as the Committee may deem advisable under the Plan or the rules, regulations and other requirements of the Securities and Exchange Commission, any stock exchange upon which such shares are listed, any applicable federal or state laws and any agreement with, or policy of, the Company or the Committee to which the Participant is a party or subject, and the Committee may cause orders or designations to be placed upon any certificate(s) or other document(s) delivered to the Participant, or on the books and records of the Company's transfer agent, to make appropriate reference to such restrictions.
- (d) No Right to Continued Service. Nothing in this Agreement or the Plan shall confer upon the Participant any right to continue in Service for any period of specific duration or interfere with or otherwise restrict in any way the rights of the Company (or any Subsidiary employing or retaining the Participant) or of the Participant, which rights are hereby expressly reserved by each, to terminate his or her Service at any time and for any reason, with or without Cause.
- (e) Notification. Any notification required by the terms of this Agreement will be given by the Participant (i) in a writing addressed to the Company at its principal executive office and will be deemed effective upon actual receipt when delivered by personal delivery or by registered or certified mail, with postage and fees prepaid, or (ii) by electronic transmission to the Company's e-mail address of the Company's General Counsel and will be deemed effective upon actual receipt. Any notification required by the terms of this Agreement will be given by the Company (x) in a writing addressed to the address that the Participant most recently provided to the Company and will be deemed effective upon personal delivery or within three (3) days of deposit with the United States Postal Service, by registered or certified mail, with postage and fees prepaid, or (y) by facsimile or electronic transmission to the Participant's primary work fax number or e-mail address (as applicable) and will be deemed effective upon confirmation of receipt by the sender of such transmission.
- (f) Entire Agreement. This Agreement and the Plan constitute the entire agreement between the parties hereto with regard to the subject matter of this Agreement. This Agreement and the Plan supersede any other agreements, representations or understandings (whether oral or written and whether express or implied) that relate to the subject matter of this Agreement.
- (g) Waiver. No waiver of any breach or condition of this Agreement will be deemed to be a waiver of any other or subsequent breach or condition whether of like or different nature.
- (h) Successors and Assigns. The provisions of this Agreement will inure to the benefit of, and be binding upon, the Company and its successors and assigns and upon the Participant, the Participant's executor, personal representative(s), distributees, administrator, permitted transferees, permitted assignees, beneficiaries and legatee(s), as applicable, whether or not any such person will have become a party to this Agreement and have agreed in writing to be joined herein and be bound by the terms hereof.

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- (i) Severability. The provisions of this Agreement are severable, and if any one or more provisions are determined to be illegal or otherwise unenforceable, in whole or in part, then the remaining provisions will nevertheless be binding and enforceable.
- (j) Choice of Law; Jurisdiction. This Agreement and all claims, causes of action or proceedings (whether in contract, in tort, at law or otherwise) that may be based upon, arise out of or relate to this Agreement will be governed by the laws of the State of Delaware, excluding any conflicts or choice-of-law rule or principle that might otherwise refer construction or interpretation of this Agreement to the substantive law of another jurisdiction. The Participant agrees that he or she will bring all claims, causes of action and proceedings (whether in contract, in tort, at law or otherwise) that may be based upon, arise out of or be related to the Plan and this Agreement exclusively in the federal and state courts located within the geographic boundaries of the United States District Court for the Eastern District of Pennsylvania (the "*Chosen Court*"), and hereby (i) irrevocably submits to the exclusive jurisdiction of the Chosen Court, (ii) waives any objection to laying venue in any such proceeding in the Chosen Court, (iii) waives any objection that the Chosen Court is an inconvenient forum or does not have jurisdiction over any party and (iv) agrees that service of process upon such party in any such claim or cause of action will be effective if notice is given in accordance with this Agreement.
- (k) Signature in Counterparts. This Agreement may be signed in counterparts, manually or electronically, each of which will be an original, with the same effect as if the signatures to each were upon the same instrument.
- (l) Acceptance. The Participant hereby acknowledges receipt of a copy of the Plan and this Agreement. The Participant has read and understands the terms and provisions of the Plan and this Agreement, and accepts the Restricted Stock subject to all of the terms and conditions of the Plan and this Agreement. In the event of a conflict between any term or provision contained in this Agreement and a term or provision of the Plan, the applicable term or provision of the Plan will govern and prevail.

[Signature page follows.]

IN WITNESS WHEREOF, the Company and the Participant have executed this Restricted Stock Award Agreement as of the Date of Grant.

Participant

PQ Group Holdings Inc.

Name:

By: _____

Name:

Title:

**PQ GROUP HOLDINGS INC.
2017 Omnibus Incentive Plan**

Restricted Stock Unit Award Agreement

This Restricted Stock Unit Award Agreement (this "*Agreement*") is made by and between PQ Group Holdings Inc., a Delaware corporation (the "*Company*"), and [•] (the "*Participant*"), effective as of [•] (the "*Date of Grant*").

RECITALS

WHEREAS, the Company has adopted the PQ Group Holdings Inc. 2017 Omnibus Incentive Plan (as the same may be amended and/or amended and restated from time to time, the "*Plan*"), which Plan is incorporated herein by reference and made a part of this Agreement, and capitalized terms not otherwise defined in this Agreement will have the meanings ascribed to those terms in the Plan; and

WHEREAS, the Committee has authorized and approved the grant of an Award of restricted stock units ("*Restricted Stock Units*") to the Participant that provides the Participant the conditional opportunity to acquire one share of Common Stock (a "*Share*") with respect to each Restricted Stock Unit forming part of the Award, subject to the terms and conditions set forth in the Plan and this Agreement.

NOW THEREFORE, in consideration of the premises and mutual covenants set forth in this Agreement, the parties agree as follows:

1. **Grant of Restricted Stock Unit Award.** The Company has granted to the Participant [•] Restricted Stock Units, effective as of the Date of Grant, on the terms and conditions set forth in the Plan and this Agreement, subject to adjustment as forth in the Plan.
2. **Vesting of Restricted Stock Units.** Subject to the terms and conditions set forth in the Plan and this Agreement, the Restricted Stock Units will vest as follows:
 - (a) **General.** Subject to the terms and conditions set forth in the Plan and this Agreement, and except as otherwise provided in Section 2(b), the Restricted Stock Units will vest [], subject to the Participant's continued Service through the applicable vesting date.
 - (b) **Termination of Service.** The Participant shall forfeit, immediately and without consideration, all unvested Restricted Stock Units upon a termination of the Participant's Service for any reason. The Participant shall forfeit, immediately and without consideration, all Shares delivered under this Award upon a termination for Cause. Without limiting the generality of the foregoing, the Restricted Stock Units and the Shares (and any resulting proceeds) will continue to be subject to Section 13 of the Plan.

3. Payment

- (a) Settlement. The Company shall deliver to the Participant within 30 days following the vesting date of the Restricted Stock Units a number of Shares equal to the aggregate number of Restricted Stock Units that vest on such date. No fractional Shares shall be delivered; the Company shall pay cash in respect of any fractional Shares. The Company may deliver such Shares either through book entry accounts held by, or in the name of, the Participant or cause to be issued a certificate or certificates representing the number of Shares to be issued in respect of the Restricted Stock Units, registered in the name of the Participant.
- (b) Withholding Requirements. [The Company will have the power and the right to deduct or withhold automatically from any Shares deliverable under this Agreement or from any other compensation payable to the Participant, or to require the Participant or the Participant's representative to remit to the Company, up to the maximum statutory amount necessary to satisfy federal, state and local taxes, domestic or foreign, required by law or regulation to be withheld with respect to any taxable event arising as a result of this Agreement. Nothing in this Agreement may be construed as relieving the Participant of his or her obligation to satisfy all taxes required to be withheld in connection with the award, vesting or settlement of the Restricted Stock Units.]¹ [The Participant is responsible for satisfying and paying all taxes arising from or due in connection with the award, vesting or settlement of the Restricted Stock Units. The Company will have no liability or obligation related to the foregoing.]²

4. Adjustment of Shares. In the event of any change with respect to the outstanding shares of Common Stock contemplated by Section 4.5 of the Plan, the Restricted Stock Units may be adjusted by the Committee in accordance with Section 4.5 of the Plan.

5. Miscellaneous Provisions

- (a) Securities Laws Requirements. No Shares will be issued or transferred pursuant to this Agreement unless and until all then applicable requirements imposed by federal and state securities and other laws, rules and regulations and by any regulatory agencies having jurisdiction, and by any exchanges upon which the Shares may be listed, have been fully met. As a condition precedent to the issuance of Shares pursuant to this Agreement, the Company may require the Participant to take any reasonable action to meet those requirements. The Committee may impose such conditions on any Shares issuable pursuant to this Agreement as it may deem advisable, including, without limitation, restrictions under the Securities Act, under the requirements of any exchange upon which shares of the same class are then listed and under any blue sky or other securities laws applicable to those Shares.

¹ To be used if the Participant is an employee.

² To be used if the Participant is a non-employee director.

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- (b) Rights of a Shareholder of the Company. Prior to settlement of the Restricted Stock Units and the delivery of Shares to the Participant with respect thereto, neither the Participant nor the Participant's representative will have any rights as a shareholder of the Company with respect to any Shares underlying the Restricted Stock Units and the Participant will not receive payment of, or credit for, dividends or dividend equivalents with respect to any Shares underlying the Restricted Stock Units.
- (c) Transfer Restrictions. The Restricted Stock Units may not be transferred except as expressly permitted under Section 15.3 of the Plan. The Shares delivered hereunder will be subject to such stop transfer orders and other restrictions as the Committee may deem advisable under the Plan or the rules, regulations and other requirements of the Securities and Exchange Commission, any stock exchange upon which such Shares are listed, any applicable federal or state laws and any agreement with, or policy of, the Company or the Committee to which the Participant is a party or subject, and the Committee may cause orders or designations to be placed upon the books and records of the Company's transfer agent to make appropriate reference to such restrictions.
- (d) No Right to Continued Service. Nothing in this Agreement or the Plan confers upon the Participant any right to continue in Service for any period of specific duration or interfere with or otherwise restrict in any way the rights of the Company (or any Subsidiary retaining the Participant) or of the Participant, which rights are hereby expressly reserved by each, to terminate his or her Service at any time and for any reason, with or without Cause.
- (e) Notification. Any notification required by the terms of this Agreement will be given by the Participant (i) in a writing addressed to the Company at its principal executive office and will be deemed effective upon actual receipt when delivered by personal delivery or by registered or certified mail, with postage and fees prepaid, or (ii) by electronic transmission to the Company's e-mail address of the Company's General Counsel and will be deemed effective upon actual receipt. Any notification required by the terms of this Agreement will be given by the Company (x) in a writing addressed to the address that the Participant most recently provided to the Company and will be deemed effective upon personal delivery or within three (3) days of deposit with the United States Postal Service, by registered or certified mail, with postage and fees prepaid, or (y) by facsimile or electronic transmission to the Participant's primary work fax number or e-mail address (as applicable) and will be deemed effective upon confirmation of receipt by the sender of such transmission.

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- (f) Entire Agreement. This Agreement and the Plan constitute the entire agreement between the parties hereto with regard to the subject matter of this Agreement. This Agreement and the Plan supersede any other agreements, representations or understandings (whether oral or written and whether express or implied) that relate to the subject matter of this Agreement.
- (g) Waiver. No waiver of any breach or condition of this Agreement will be deemed to be a waiver of any other or subsequent breach or condition whether of like or different nature.
- (h) Successors and Assigns. The provisions of this Agreement will inure to the benefit of, and be binding upon, the Company and its successors and assigns and upon the Participant, the Participant's executor, personal representative(s), distributees, administrator, permitted transferees, permitted assignees, beneficiaries, and legatee(s), as applicable, whether or not any such person will have become a party to this Agreement and have agreed in writing to be joined herein and be bound by the terms hereof.
- (i) Severability. The provisions of this Agreement are severable, and if any one or more provisions are determined to be illegal or otherwise unenforceable, in whole or in part, then the remaining provisions will nevertheless be binding and enforceable.
- (j) Choice of Law; Jurisdiction. This Agreement and all claims, causes of action or proceedings (whether in contract, in tort, at law or otherwise) that may be based upon, arise out of or relate to this Agreement will be governed by the laws of the State of Delaware, excluding any conflicts or choice-of-law rule or principle that might otherwise refer construction or interpretation of this Agreement to the substantive law of another jurisdiction. The Participant agrees that he or she will bring all claims, causes of action and proceedings (whether in contract, in tort, at law or otherwise) that may be based upon, arise out of or be related to the Plan and this Agreement exclusively in the federal and state courts located within the geographic boundaries of the United States District Court for the Eastern District of Pennsylvania (the "*Chosen Court*"), and hereby (i) irrevocably submits to the exclusive jurisdiction of the Chosen Court, (ii) waives any objection to laying venue in any such proceeding in the Chosen Court, (iii) waives any objection that the Chosen Court is an inconvenient forum or does not have jurisdiction over any party and (iv) agrees that service of process upon such party in any such claim or cause of action will be effective if notice is given in accordance with this Agreement.
- (k) Signature in Counterparts. This Agreement may be signed in counterparts, manually or electronically, each of which will be an original, with the same effect as if the signatures to each were upon the same instrument.
- (l) Acceptance. The Participant hereby acknowledges receipt of a copy of the Plan and this Agreement. The Participant has read and understands the terms and provisions of the Plan and this Agreement, and accepts the Restricted Stock Units subject to all of the terms and conditions of the Plan and this Agreement. In the event of a conflict between any term or provision contained in this Agreement and a term or provision of the Plan, the applicable term and provision of the Plan will govern and prevail.

[Signature page follows.]

IN WITNESS WHEREOF, the Company and the Participant have executed this Restricted Stock Unit Award Agreement as of the Date of Grant.

PARTICIPANT

PQ GROUP HOLDINGS INC.

By: _____

[Signature Page – Restricted Stock Unit Award Agreement]

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the use in this Amendment No. 3 to the Registration Statement on Form S-1 of PQ Group Holdings Inc. of our report dated June 9, 2017 relating to the financial statements, and financial statement schedule, which appears in such Registration Statement. We also consent to the reference to us under the heading "Experts" in such Registration Statement.

/s/ PricewaterhouseCoopers LLP

Philadelphia, PA

September 1, 2017

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the use in this Amendment No. 3 to Registration Statement No. 333-218650 of our report dated May 15, 2015, except for Note 12 and Note 20, as to which the date is June 8, 2017, relating to the consolidated financial statements of Eco Services Operations LLC and subsidiary (accounting predecessor to PQ Group Holdings Inc.) for the period from inception (July 30, 2014) to December 31, 2014 (Successor Period) and Eco, a business unit of Solvay USA Inc., for the period from January 1, 2014 to November 30, 2014 (Predecessor Period) (which report expresses an unqualified opinion and includes an emphasis of matter paragraph referring to the “carveout” of the predecessor financial statements from Solvay USA Inc.) appearing in the Prospectus, which is part of this Registration Statement.

We also consent to the reference to us under the heading “Experts” in such Prospectus.

/s/ DELOITTE & TOUCHE LLP

Parsippany, New Jersey
September 1, 2017

CONSENT OF INDEPENDENT ACCOUNTANTS

We hereby consent to the use in this Amendment No. 3 to the Registration Statement on Form S-1 of PQ Group Holdings Inc. of our report dated March 5, 2016 relating to the financial statements of PQ Holdings Inc., which appears in such Registration Statement. We also consent to the reference to us under the heading "Experts" in such Registration Statement.

/s/ PricewaterhouseCoopers LLP

Philadelphia, PA

September 1, 2017

CONSENT OF INDEPENDENT ACCOUNTANTS

We hereby consent to the use in this Amendment No. 3 to the Registration Statement on Form S-1 of PQ Group Holdings Inc. of our report dated March 21, 2017 relating to the financial statements of Zeolyst International, which appears in such Registration Statement. We also consent to the reference to us under the heading "Experts" in such Registration Statement.

/s/ PricewaterhouseCoopers LLP

Philadelphia, PA

September 1, 2017



ROPES & GRAY LLP
PRUDENTIAL TOWER
800 BOYLSTON STREET
BOSTON, MA 02199-3600
WWW.ROPESGRAY.COM

September 1, 2017

VIA EDGAR

Securities and Exchange Commission
Division of Corporation Finance
100 F. Street, N.E.
Washington, D.C. 20549

Attention: Asia Timmons-Pierce/Chris Ronne—Legal
Anne McConnell/Melinda Hooker—Accounting

Re: PQ Group Holdings Inc.
Amendment No. 2 to Registration Statement on Form S-1, filed August 14, 2017
File No. 333-218650
SEC Comment Letter dated August 28, 2017

Ladies and Gentleman:

On behalf of PQ Group Holdings Inc. (the "Company"), and pursuant to the applicable provisions of the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder, we submit via EDGAR for review by the Securities and Exchange Commission (the "SEC") the accompanying Amendment No. 3 (including certain exhibits) to the Company's above-referenced Registration Statement on Form S-1 (the "Registration Statement"). A copy of Amendment No. 3 to the Registration Statement has been manually signed in accordance with Rule 302 of Regulation S-T and the signature pages thereto will be retained by the Company for a period of five years.

Amendment No. 3 to the Registration Statement reflects the Company's responses to the comments received from the staff of the SEC (the "Staff") contained in the Staff's letter dated August 28, 2017 (the "Comment Letter") and certain other updated information. For your convenience, the Company is supplementally providing to the Staff a typeset copy of Amendment No. 3 marked to indicate the changes from Amendment No. 2 to the Registration Statement, which was filed on August 14, 2017.

The Staff's comments as reflected in the Comment Letter are reproduced in italics in this letter, and the corresponding responses of the Company are shown below each comment. All references to page numbers in the Company's responses are to the page numbers in Amendment No. 3 to the Registration Statement. All capitalized terms used herein that are not defined herein shall have the meanings assigned to such terms in Amendment No. 3 to the Registration Statement.

Prospectus Summary, page 1

Our Business Strategy, page 12

1. *We note your disclosure that you “have identified a number of potential acquisition targets with complementary fits across both of your operating segments.” Please clarify that no significant acquisitions are probable or provide the additional historical and pro forma financial statements required by Rules 3-05 and 11-01 of Regulation S-X.*

Response to Comment 1:

The Company supplementally advises the Staff that none of the potential acquisition targets identified by the Company involve transactions that are either probable or rise to the level of significance required for the provision of additional historical and pro forma financial statements pursuant to Rules 3-05 and 11-01 of Regulation S-X.

Consolidated Financial Statements

PQ Group Holdings Inc.

7. Business Combination, page F-27

2. *As requested in comment 11 of our letter dated August 3, 2017, please clarify the nature of the current non-controlling interest in PQ Group Holdings Inc.*

Response to Comment 2:

The Registration Statement has been revised on page F-11 in response to this comment. The Company supplementally advises the Staff that the Company's non-controlling interest represents a 20% third-party equity interest in a Mexican subsidiary and a 25% third-party equity interest in a Thai subsidiary, both of which were acquired as part of the Business Combination.

3. *In regard to your response to comment 11 of our letter dated August 3, 2017, please also address the following:*
 - *We note the prior ownership interests in Legacy PQ received Class A common stock and Class B common stock. More fully explain who received Class A common stock, who received Class B common stock, and the reasons why the prior ownership interests received different classes of common stock;*

- *We note the Reclassification will result in the Class A common stock converting to common stock and then being effected by a stock split and the Class B common stock converting to common stock based on reference to the initial public offering price. More fully explain why the conversions of the Class A common stock and Class B common stock are different, including the reasons for and effect of the expected dilution to the Class A common stockholders; and,*
- *Address the expected impact of the initial public offering on outstanding stock options and restricted stock.*

Response to Comment 3:

The Company supplementally advises the Staff that the difference in the Class A and Class B common stock of PQ Group Holdings Inc. is based on the underlying nature of the Legacy PQ Class A and Class B common stock. The shares of Class A common stock of Legacy PQ were initially granted to members of management and one of that company's directors as equity incentive awards under a Legacy PQ equity incentive plan, whereas the shares of Class B common Stock of Legacy PQ were sold to investors (which included the financial sponsors as well as members of management and other third party investors). Following the completion of the Business Combination (as defined in the Registration Statement), the Legacy PQ Class A and Class B common stock became Class A and Class B common stock, respectively, of PQ Group Holdings Inc.

In connection with the Reclassification, the Class A common stock will simply be renamed common stock (it will not convert into shares of the Company's common stock). As such, each share of Class A common stock will, before giving effect to the stock split, represent one share of the Company's common stock. As part of the Reclassification, and immediately prior to the initial public offering, each share of Class B common stock will convert, in accordance with its terms, into one share of common stock (adjusted to reflect any stock split of the Company's common stock that was effected as part of the Reclassification) plus an additional number of shares of common stock determined by dividing the unreturned paid-in capital amount of such share of Class B common stock by the initial public offering price of a share of the Company's common stock, rounded to the nearest whole share. This feature of the Class B common stock was included in the Class B common stock in order to address the fact that the Class B common stock, unlike the Class A common stock, was sold to investors. The conversion of the Class B common stock into common stock will result in the issuance of additional shares of common stock, which will dilute all holders of common stock; however such dilution will be borne primarily by holders of common stock who do not also hold shares of Class B common stock (since such stockholders will not receive any of the shares to be issued upon conversion of the Class B common stock). The Company has included a chart on page 52 of the Registration Statement detailing the effect of different initial public offering prices on the number of shares of common stock to be issued upon conversion of the Class B common stock in order to provide investors with additional information regarding the impact of the conversion of the Class B common stock on an investor in the Company's initial public offering.

The consummation of the initial public offering will not trigger, on its own, any vesting of outstanding stock options or restricted stock awards (and the vesting terms of such awards will remain unchanged). Each outstanding Class A common stock option or Class A restricted stock award will, as a result of the Reclassification, become an option to purchase shares of the Company's common stock or a restricted common stock award, as applicable (and the exercise price associated with any such stock option will be appropriately adjusted to reflect any stock split that occurs as part of the Reclassification). Each outstanding Class B restricted stock award will be adjusted as a result of the conversion of Class B common stock into common stock into a restricted common stock award relating to a number of shares of common stock determined in accordance with the Class B conversion methodology described above. The Company does not have any outstanding options to purchase shares of its Class B common stock.

* * *

Securities and Exchange Commission
Division of Corporation Finance
September 1, 2017

We hope that the foregoing has been responsive to the Staff's comments. If you have any questions or comments about this letter or need any further information, please call the undersigned at (617) 951-7802 or Raymond J. Grant of our offices at (617)235-4668.

Very truly yours,
/s/ Craig E. Marcus
Craig E. Marcus

cc: Joseph S. Koscinski (PQ Group Holdings Inc.)
Jason M. Licht (Latham & Watkins LLP)