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

FORM 10-K

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

For the fiscal year ended December 31, 2020
or

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

For the transition period from to

Commission file number 001-12019

QUAKER CHEMICAL CORPORATION
(Exact name of Registrant as specified in its charter)

A Pennsylvania Corporation **(State or other jurisdiction of incorporation or organization)**	**No. 23-0993790** **(I.R.S. Employer Identification No.)**
901 E. Hector Street, **Conshohocken, Pennsylvania** **(Address of principal executive offices)**	**19428-2380** **(Zip Code)**

Registrant's telephone number, including area code: (610) 832-4000

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $1 par value	KWR	New York Stock Exchange

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

None

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

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

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark 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 ☐	Smaller reporting company ☐
	Emerging growth company ☐

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. Yes ☒ No ☐

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

State the aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold as of the last business day of the Registrant's most recently completed second fiscal quarter. (The aggregate market value is computed by reference to the last reported sale on the New York Stock Exchange on June 30, 2020): $3,273,904,147

Indicate the number of shares outstanding of each of the Registrant's classes of common stock, as of the latest practicable date: 17,853,700 shares of Common Stock, $1.00 Par Value, as of January 31, 2021.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Registrant's definitive Proxy Statement relating to the 2021 Annual Meeting of Shareholders are incorporated by reference into Part III.

QUAKER CHEMICAL CORPORATION
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PART I

As used in this Annual Report on Form 10-K (the "Report"), the terms "Quaker Houghton", the "Company", "we", and "our" refer to Quaker Chemical Corporation (doing business as Quaker Houghton), its subsidiaries, and associated companies, unless the context otherwise requires. The term Legacy Quaker refers to the Company prior to the closing of its combination with Houghton International, Inc. ("Houghton") (herein referred to as the "Combination") on August 1, 2019. Throughout the Report, all figures presented, unless otherwise stated, reflect the results of operations of the combined company for the year ended December 31, 2020; and for the year ended December 31, 2019, the results of Legacy Quaker plus five months of Houghton's operations post-closing of the Combination on August 1, 2019; and for the year ended December 31, 2018, the results of only Legacy Quaker.

Item 1. *Business.*

General Description

The Company was organized in 1918, incorporated as a Pennsylvania business corporation in 1930, and in August 2019 completed the Combination with Houghton to form Quaker Houghton. Quaker Houghton is a global leader in industrial process fluids. With a presence around the world, including operations in over 25 countries, the Company's customers include thousands of the world's most advanced and specialized steel, aluminum, automotive, aerospace, offshore, can, mining, and metalworking companies. Quaker Houghton develops, produces, and markets a broad range of formulated chemical specialty products and offers chemical management services (which we refer to as "Fluidcare^{TM}") for various heavy industrial and manufacturing applications throughout its four segments: Americas; Europe, Middle East and Africa ("EMEA"); Asia/Pacific; and Global Specialty Businesses.

The major product lines of Quaker Houghton include metal removal fluids, cleaning fluids, corrosion inhibitors, metal drawing and forming fluids, die cast mold releases, heat treatment and quenchants, metal forging fluids, hydraulic fluids, specialty greases, offshore sub-sea energy control fluids, rolling lubricants, rod and wire drawing fluids and surface treatment chemicals. The following are the respective contributions to consolidated net sales of each of our principal product lines representing more than 10% of consolidated net sales for any of the past three years based on the Company's current product line segmentation:

	2020	2019	2018
Metal removal fluids	23.9 %	19.9 %	15.4 %
Rolling lubricants	21.8 %	21.9 %	25.5 %
Hydraulic fluids	13.3 %	13.0 %	13.0 %

Houghton Combination

On August 1, 2019, the Company completed the Combination and acquired all of the issued and outstanding shares of Houghton from Gulf Houghton Lubricants, Ltd. ("Gulf") and certain other selling shareholders in exchange for a combination of cash and shares of the Company's common stock in accordance with the share purchase agreement dated April 4, 2017 (the "Share Purchase Agreement"). The shares were bought for an aggregate purchase consideration consisting of: (i) $170.8 million in cash; (ii) the issuance of approximately 4.3 million shares of the Company's common stock, $1.00 par value per share, comprising 24.5% of the common stock outstanding upon the closing of the Combination; and (iii) the Company's refinancing of Houghton's net indebtedness as of the closing of the Combination of approximately $702.6 million.

Houghton is a leading global provider of specialty chemicals and technical services for metalworking and other industrial applications, and, the combination with Legacy Quaker created a leading global supplier of industrial process fluids. The Combination expanded the Company's addressable metalworking, metals and industrial end markets, including steel, aluminum, aerospace, defense, transportation-original equipment manufacturer ("OEM"), transportation-components, offshore sub-sea energy, architectural aluminum, construction, tube and pipe, can and container, mining, specialty coatings and specialty greases. The Combination also strengthened the product portfolio of the combined Company.

Notable Recent Acquisition Activity

In December 2020, the Company completed its acquisition of Coral Chemical Company ("Coral"), a privately held, U.S.-based provider of metal finishing fluid solutions, for approximately $53 million, net of cash acquired. Coral provides technical expertise and product solutions for pre-treatment, metalworking and wastewater treatment applications to the beverage can and general industrial end markets. In February 2021, the Company acquired certain assets related to tin-plating solutions primarily for steel end markets for approximately $25 million.

Impact of COVID-19

During 2020, the global outbreak of COVID-19 and subsequent pandemic negatively impacted all locations where the Company does business. Although the Company has now operated during several quarters in this COVID-19 environment, the full extent of the pandemic and related business impacts remains uncertain and volatile, and therefore the full extent to which COVID-19 may impact the Company's future results of operations or financial condition is uncertain. The pandemic has disrupted the operations of the Company and its suppliers and customers and, as a result, the Company experienced volume declines and lower net sales during 2020 as further described in Item 7 of this Report. The initial impact was at its China subsidiaries in the first quarter of 2020 and beginning in late March continued throughout 2020 in the rest of the business as the pandemic led to a global economic slowdown. Management continues to monitor the impact of the COVID-19 pandemic on the Company, the overall specialty chemical industry and the economies and markets in which the Company operates.

Sales Revenue

A substantial portion of the Company's sales worldwide are made directly through its own employees and its Fluidcare programs, with the balance sold through distributors and agents. The Company's employees typically visit the plants of customers regularly, work on site, and through training and experience, identify production needs which can be resolved or otherwise addressed either by utilizing the Company's existing products or by applying new formulations developed in its laboratories.

The Company recognizes revenue in an amount that reflects the consideration that the Company expects to receive in exchange for the goods or services transferred to its customers. To do this, the Company applies a five-step model that requires the Company to: (i) identify the contract with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when, or as, the Company satisfies a performance obligation.

As part of the Company's Fluidcare business, certain third-party product sales to customers are managed by the Company. Where the Company acts as principal, revenues are recognized on a gross reporting basis at the selling price negotiated with its customers. Where the Company acts as an agent, revenue is recognized on a net reporting basis at the amount of the administrative fee earned by the Company for ordering the goods. The Company transferred third-party products under arrangements resulting in net reporting of $42.5 million, $48.0 million and $47.1 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Competition

The specialty chemical industry comprises a number of companies similar in size to the Company, as well as companies larger and smaller than Quaker Houghton. The Company cannot readily determine its precise position in every industry it serves. However, the Company estimates it holds a leading global position in the market for industrial process fluids including significant global positions in the markets for process fluids in portions of the automotive and industrial markets, and a leading position in the market for process fluids to produce sheet steel and aluminum. The offerings of many of the Company's competitors differ from those of Quaker Houghton; some offer a broad portfolio of fluids, including general lubricants, while others have more specialized product ranges. All competitors provide different levels of technical services to individual customers. Competition in the industry is based primarily on the ability to supply products that meet the needs of the customer and provide technical services and laboratory assistance to the customer, and to a lesser extent, on price.

Major Customers and Markets

In 2020, Quaker Houghton's five largest customers (each composed of multiple subsidiaries or divisions with semi-autonomous purchasing authority) accounted for approximately 10% of consolidated net sales, with its largest customer accounting for approximately 3% of consolidated net sales. A significant portion of the Company's revenues are realized from the sale of process fluids and services to manufacturers of steel, aluminum, automobiles, aircraft, industrial equipment, and durable goods and, therefore, Quaker Houghton is subject to the same business cycles as those experienced by these manufacturers and their customers. The Company's financial performance is generally correlated to the volume of global production within the industries it serves, rather than directly related to the financial performance of its customers. Furthermore, steel and aluminum customers typically have limited manufacturing locations compared to metalworking customers and generally use higher volumes of products at a single location.

Raw Materials

Quaker Houghton uses approximately 3,000 raw materials, including animal fats, vegetable oils, mineral oils, oleochemicals, ethylene, solvents, surfactant agents, various chemical compounds that act as additives to our base formulations, and a wide variety of other organic and inorganic compounds and various derivatives of the foregoing. The price of mineral oil and its derivatives can be affected by the price of crude oil and industry refining capacity. Animal fat and vegetable oil prices, as well as the prices of other raw materials, are impacted by their own unique supply and demand factors, and by biodiesel consumption which is affected by the price of crude oil. Accordingly, significant fluctuations in the price of crude oil can have a material impact on the cost of these raw materials. In addition, many of the raw materials used by Quaker Houghton are commodity chemicals which can experience significant price volatility. Accordingly, the Company's earnings could be affected by market changes in raw material prices. Reference is made to the disclosure contained in Item 7A of this Report.

Patents and Trademarks

Quaker Houghton has a limited number of patents and patent applications including patents issued, applied for, or acquired in the U.S. and in various foreign countries, some of which may prove to be material to its business, with the earliest patent expiry in 2021. The Company principally relies on its proprietary formulae and its applications know-how and experience to meet customer needs. Quaker Houghton products are identified by numerous trademarks that are registered throughout its marketing area.

Research and Development—Laboratories

The Company maintains approximately thirty separate laboratory facilities worldwide that are primarily devoted to applied research and development. In addition, the Company maintains quality control labs at each of its manufacturing facilities. Quaker Houghton research and development is directed primarily toward applied technology since the nature of the Company's business requires continual modification and improvement of formulations to provide specialty chemicals to satisfy customer requirements. If problems are encountered which cannot be resolved by local laboratories, the problem is referred to one of our ten principal laboratories, located in Conshohocken, Pennsylvania; Valley Forge, Pennsylvania; Aurora, Illinois; Santa Fe Springs, California; Uithoorn, the Netherlands; Coventry, United Kingdom; Dortmund, Germany; Barcelona, Spain; Turin, Italy or Qingpu, China.

Research and development costs are expensed as incurred. Research and development expenses during the years ended December 31, 2020, 2019 and 2018 were $40.0 million, $32.1 million and $24.5 million, respectively.

Regulatory Matters

In order to facilitate compliance with applicable federal, state, and local statutes and regulations relating to occupational health and safety and protection of the environment, the Company has an ongoing program of site assessment for the purpose of identifying capital expenditures or other actions that may be necessary to comply with such requirements. The program includes periodic inspections of each facility by the Company and/or independent experts, as well as ongoing inspections and training by on-site personnel. Such inspections address operational matters, record keeping, reporting requirements and capital improvements. Capital expenditures directed solely or primarily to regulatory compliance amounted to approximately $3.7 million, $4.4 million and $1.5 million during the years ended December 31, 2020, 2019 and 2018, respectively.

Company Segmentation

The Company's operating segments, which are consistent with its reportable segments, reflect the structure of the Company's internal organization, the method by which the Company's resources are allocated and the manner by which the Company and the chief operating decision maker assess performance. The Company's reportable segments are: (i) Americas; (ii) EMEA; (iii) Asia/Pacific; and (iv) Global Specialty Businesses. See Note 4 of Notes to Consolidated Financial Statements in Item 8 of this Report, incorporated herein by this reference.

Non-U.S. Activities

Since significant revenues and earnings are generated by non-U.S. operations, the Company's financial results are affected by currency fluctuations, particularly between the U.S. dollar and the euro, the British pound sterling, the Brazilian real, the Mexican peso, the Chinese renminbi and the Indian rupee, and the impact of those currency fluctuations on the underlying economies. Incorporated by reference is (i) the foreign exchange risk information contained in Item 7A of this Report, (ii) the geographic information in Note 4 of Notes to Consolidated Financial Statements included in Item 8 of this Report, and (iii) information regarding risks attendant to foreign operations included in Item 1A of this Report.

Number of Employees

On December 31, 2020, Quaker Houghton had approximately 4,200 full-time employees globally of whom approximately 900 were employed by the parent company and its U.S. subsidiaries, and approximately 3,300 were employed by its non-U.S. subsidiaries. Associated companies of Quaker Houghton (in which it owns 50% or less and has significant influence) employed approximately 600 people on December 31, 2020.

Core Values

Quaker Houghton considers its employees as its greatest strength in differentiating our business and strengthening our market positions. We have established core values that are inclusive of embracing diversity and creating a culture where we learn from and are inspired by the many cultures, backgrounds and knowledge of our team members. The Company's goal is to have an organization that is inclusive of all its people and is representative of the communities in which we operate.

The Company's core values are (i) live safe; (ii) act with integrity; (iii) drive results; (iv) exceed customer expectations; (v) embrace diversity; and (vi) do great things together. Our core values embody who we are as a company, guide our decisions and inspire us. Our commitment to these values, in words and actions, builds a safer, stronger Quaker Houghton, and these values guide the Company's internal conduct and its relationship with the outside world. By fostering a culture and environment that exemplifies our core values, we gain, as a company, unique perspectives, backgrounds and varying experiences to ensure continued long-term success. The Company respects and values all of its employees and believes inclusion, diversity and equality are essential pillars to drive the Company's success.

Workplace Safety

We are committed to maintaining a strong safety culture and to emphasizing the importance of our employees' role in identifying, mitigating and communicating safety risks. We maintain policies and operational practices that communicate a culture where all levels of employees are responsible for safety. We believe that the achievement of superior safety performance is both an important short-term and long-term strategic goal in managing our operations. We emphasize ten "lifesaving" rules which make a significant difference in preventing serious injuries and fatalities. We also require all employees to regularly complete safety training. Additionally, our senior management team is closely involved in our safety programs and conducts regular reviews of safety performance metrics and reviews the Company's safety performance during Company-wide meetings.

Talent Management and Retention

Maintaining a robust pipeline of talent is crucial to our continued success and is a key aspect of succession planning efforts across the organization. Our leadership and human resources teams are responsible for attracting and retaining top talent by facilitating an environment where employees want to show up to work and do great things together. To achieve sustained high performance, management invests in the development, safety, and wellbeing of our employees. Additionally, we regularly evaluate our compensation and benefits package, including health and wellness benefits, paid-time off policies, monetary compensation, and educational reimbursements, to ensure that our total compensation and benefits packages are aligned with our business strategy, organizational culture, and diversity and inclusion philosophy while ensuring that we remain competitive in the markets we serve while following local and statutory wage and benefits laws and guidelines.

Sustainability Report

The Company publishes annual sustainability reports which are available free of charge on its corporate website under "Investors - Commitment to Sustainability - Sustainability Report." The Company's 2019 Sustainability Report reflects the most recent available data on a variety of topics, including specific information relating to: (i) the Company's environmental footprint and climate change initiatives; (ii) the Company's diversity initiatives; (iii) certain safety metrics; and (iv) training courses our employees completed. Information included in these sustainability reports is not intended to be incorporated into this Report.

Quaker Houghton on the Internet

Financial results, news and other information about Quaker Houghton can be accessed from the Company's website at https://www.quakerhoughton.com. This site includes important information on the Company's locations, products and services, financial reports, news releases and career opportunities. The Company's periodic and current reports on Forms 10-K, 10-Q, 8-K, and other filings, including exhibits and supplemental schedules filed therewith, and amendments to those reports, filed with the Securities and Exchange Commission ("SEC") are available on the Company's website, free of charge, as soon as reasonably practicable after they are electronically filed with or furnished to the SEC. Information contained on, or that may be accessed through, the Company's website is not incorporated by reference in this Report and, accordingly, you should not consider that information part of this Report.

Factors that May Affect Our Future Results

(Cautionary Statements under the Private Securities Litigation Reform Act of 1995)

Certain information included in this Report and other materials filed or to be filed by Quaker Chemical Corporation with the SEC (as well as information included in oral statements or other written statements made or to be made by us) contain or may contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements can be identified by the fact that they do not relate strictly to historical or current facts. We have based these forward-looking statements, including statements regarding the potential effects of the COVID-19 pandemic on the Company's business, results of operation, and financial condition, and our expectations that we will maintain sufficient liquidity and remediate any of our material weaknesses in internal control over financial reporting on our current expectations about future events.

These forward-looking statements include statements with respect to our beliefs, plans, objectives, goals, expectations, anticipations, intentions, financial condition, results of operations, future performance, and business, including:

- the potential benefits of the Combination and other acquisitions;
- the impacts on our business as a result of the COVID-19 pandemic and any projected global economic rebound or anticipated positive results due to Company actions taken in response to the pandemic;
- our current and future results and plans; and
- statements that include the words "may," "could," "should," "would," "believe," "expect," "anticipate," "estimate," "intend," "plan" or similar expressions.

Such statements include information relating to current and future business activities, operational matters, capital spending, and financing sources. From time to time, forward-looking statements are also included in the Company's other periodic reports on Forms 10-K, 10-Q and 8-K, press releases, and other materials released to, or statements made to, the public.

Any or all of the forward-looking statements in this Report, in the Company's Annual Report to Shareholders for 2020 and in any other public statements we make may turn out to be wrong. This can occur as a result of inaccurate assumptions or as a consequence of known or unknown risks and uncertainties. Many factors discussed in this Report will be important in determining our future performance. Consequently, actual results may differ materially from those that might be anticipated from our forward-looking statements.

We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise. However, any further disclosures made on related subjects in the Company's subsequent reports on Forms 10-K, 10-Q, 8-K and other related filings should be consulted. A major risk is that demand for the Company's products and services is largely derived from the demand for our customers' products, which subjects the Company to uncertainties related to downturns in a customer's business and unanticipated customer production shutdowns. Other major risks and uncertainties include, but are not limited to, the primary and secondary impacts of the COVID-19 pandemic including actions taken in response to the pandemic by various governments, which could exacerbate some or all of the other risks and uncertainties faced by the Company, including the potential for significant increases in raw material costs, supply chain disruptions, customer financial instability, worldwide economic and political disruptions, foreign currency fluctuations, significant changes in applicable tax rates and regulations, future terrorist attacks and other acts of violence, each of which is discussed in greater detail in Item 1A of this Report. Furthermore, the Company is subject to the same business cycles as those experienced by our customers in the steel, automobile, aircraft, industrial equipment, and durable goods industries. The ultimate significance of COVID-19 impacts on our business will depend on, among other things, the extent and duration of the pandemic, the severity of the disease and the number of people infected with the virus, the continued uncertainty regarding availability, administration and long-term efficacy of a vaccine, or other treatments, including on new strands or mutations of the virus, the longer term effects on the economy, including the resulting market volatility, and the measures taken by governmental authorities and other third parties restricting day-to-day life and business operations and the length of time that such measures remain in place, as well as laws and other governmental programs implemented to address the pandemic or assist impacted businesses, such as fiscal stimulus and other legislation designed to deliver monetary aid and other relief. Other factors could also adversely affect us, including those related to the Combination and other acquisitions and the integration of the acquired businesses. Our forward-looking statements are subject to risks, uncertainties and assumptions about the Company and its operations that are subject to change based on various important factors, some of which are beyond our control. These risks, uncertainties, and possibly inaccurate assumptions relevant to our business could cause our actual results to differ materially from expected and historical results.

Therefore, we caution you not to place undue reliance on our forward-looking statements. For more information regarding these risks and uncertainties as well as certain additional risks that we face, refer to the Risk Factors section in Item 1A of this Report, and in our quarterly and other reports filed from time to time with the SEC. This discussion is provided as permitted by the Private Securities Litigation Reform Act of 1995.

Item 1A. ***Risk Factors.***

There are many factors that may affect our business and results of operations, including the following risks relating to: (1) the demand for our products and services and our ability to grow our customer base; (2) our business operations, including internal and external factors that may impact our operational continuity; (3) our international operations; (4) our supply chain; (5) domestic and foreign taxation and government regulation and oversight; and (6) more general risk factors that may impact our business.

Risks Related to the Demand for our Products and Services and our Customer Base

Changes to the industries and markets that we serve could have a material adverse effect on our liquidity, financial position and results of operations.

As a leader in industrial process fluids, the Company is subject to the same business cycles as those experienced by our customers that participate in the steel, automobile, aircraft, industrial equipment, aerospace, aluminum and durable goods industries. Because demand for our products and services is largely derived from the global demand for their products, we are subject to uncertainties related to downturns in our customers' businesses and unanticipated shutdowns or curtailments of our customers' production, including as a result of adverse changes affecting national, regional and global economies or increased competitive pressure within our customers' industries. For example, our business was adversely affected by the production slowdown of the Boeing 737 Max aircraft that occurred in 2020. Our customers may experience deterioration of their businesses, cash flow shortages and difficulty obtaining financing, leading them to delay or cancel plans to purchase products, and they may not be able to fulfill their obligations in a timely fashion. We have limited ability to adjust our costs contemporaneously with changes in sales; thus, a significant sudden downturn in sales due to reductions in global production within the industries we serve and/or weak end-user markets could have a material adverse effect on our liquidity, financial position and results of operations. Further, our suppliers and other business partners may experience similar conditions, which could impact their ability to fulfill their obligations to us and also result in material adverse effects on our liquidity, financial position and results of operations.

Changes in competition in the industries and markets we serve could have a material adverse effect on our liquidity, financial position and results of operations.

The specialty chemical industry is highly competitive and there are many companies with significant financial resources and/or customer relationships that compete with us to provide similar products and services. Some competitors may be able to offer more favorable or flexible pricing and service terms or, due to their larger size or greater access to resources, may be better able to adapt to changes in conditions in our industries, fluctuations in the costs of raw materials or changes in global economic conditions, potentially resulting in reduced profitability and/or a loss of market share for us. The pricing decisions of our competitors could lead us to decrease our prices which could negatively affect our margins and profitability. In addition, our competitors could potentially consolidate their businesses to gain scale to better position their product offerings, which could have a negative impact on our profitability and market share. Competition in our industry historically has also been based on the ability to provide products that meet the needs of the customer and render technical services and laboratory assistance, which our competitors may be able to accomplish more effectively than we are able to do. Further, in connection with obtaining regulatory approval of the Combination, we divested certain of Houghton's products and related assets to a competitor which they may use to compete with us in certain areas where we continue to sell those products. If we are unsuccessful with differentiating ourselves, it could have a material adverse effect on our liquidity, financial position and results of operations and we could lose market share to our competitors.

Loss of a significant customer, bankruptcy of a major customer, or the closure of or significant reduction in production at a customer site could have a material adverse effect on our liquidity, financial position and results of operations.

During 2020, the Company's top five largest customers (each composed of multiple subsidiaries or divisions with semi-autonomous purchasing authority) together accounted for approximately 10% of our consolidated net sales, with the largest customer accounting for approximately 3% of our consolidated net sales. The loss of a significant customer could have a material adverse effect on our liquidity, financial position and results of operations. Also, a significant portion of our revenues is derived from sales to customers in the cyclical steel, aerospace, aluminum and automotive industries where bankruptcies have occurred in the past and where companies have periodically experienced financial difficulties. If a significant customer experiences financial difficulties or files for bankruptcy protection, we may be unable to collect on our receivables, and customer manufacturing sites may be closed or contracts voided. The bankruptcy of a major customer could therefore have a material adverse effect on our liquidity, financial position and results of operations. Also, some of our customers, primarily in the steel, aluminum and aerospace industries, often have fewer manufacturing locations compared to other metalworking customers and generally use higher volumes of products at a single location. The loss, closure or significant reduction in production at one or more of these locations or other major sites of a significant customer could have a material adverse effect on our business.

We may not be able to timely develop, manufacture and gain market acceptance of new and enhanced products required to maintain or expand our business, which could adversely affect our competitive position and our liquidity, financial position and results of operations.

We believe that our continued success depends on our ability to continuously develop and manufacture new products and product enhancements on a timely and cost-effective basis in response to customer demands for higher performance process chemicals and other product offerings. Our competitors may develop new products or enhancements to their products that offer performance, features and lower prices that may render our products less competitive or obsolete, and we may lose business and/or significant market share. The development and commercialization of new products requires significant expenditures over an extended period of time, and some products that we seek to develop may fail to gain traction or never become profitable. In any event, ongoing investments in research and development for the future do not yield an immediate beneficial impact on our operating results and therefore could result in higher costs without a proportional increase in revenues.

In addition, our customers use our specialty chemicals for a broad range of applications. Changes in our customers' products or processes or changes in regulatory, legislative or industry requirements may lead our customers to reduce consumption of the specialty chemicals that we produce or make them unnecessary or less attractive. Customers may also adopt alternative materials or processes that do not require our products. An example of such evolving customer demands and industry trends is the movement towards light weighting of materials and electric vehicles. Should a customer decide to use a different material due to price, performance or other considerations, we may not be able to supply a product that meets the customer's new requirements. Consequently, it is important that we develop new products to replace the products that mature and decline in use. Despite our efforts, we may not be able to develop and introduce products incorporating new technologies in a timely manner that will satisfy our customers' future needs or achieve market acceptance. Moreover, new products may have lower margins than the products they replace. Our business, results of operations, cash flows and margins could be materially adversely affected if we are unable to manage successfully the maturation or obsolescence of our existing products and the introduction of new products.

Risks Related to Business Operations, Including Internal and External Factors that May Impact Our Operational Continuity

Our ability to profitably operate our consolidated company as anticipated requires us to effectively complete the integration of our consolidated operations. An inability to appropriately capitalize on growth, including organic growth and future acquisitions, could adversely affect our liquidity, financial position and results of operations.

Completing the integration of the combined Quaker Houghton presents the Company with significant risks, which may affect our ability to achieve expected cost synergies or expand our combined business into new markets and geographies. These risks include, among others:

- the diversion of management time and focus from operating our business to address challenges that may arise in the continued integration of Houghton;
- the transition of further operations and customers of Houghton to the combined business, including across different cultures and languages, and the need to address the particular economic, currency, political, and regulatory risks associated with specific countries;
- the failure to realize anticipated operational or financial synergies;
- delays in the implementation or remediation of controls, procedures, and policies at Houghton;
- possible liabilities for activities of Houghton before the acquisition, such as possible violations of laws, commercial disputes, tax liabilities (as discussed in Note 26 of Notes to Consolidated Financial Statements included in Item 8 of this Report), and other known and unknown liabilities that may not be sufficiently protected against in the Share Purchase Agreement.

In addition to the Combination, we have completed several other acquisitions over the past several years as discussed in Note 2 of the Notes to the Consolidated Financial Statements included in Item 8 of this Report. Acquired companies may have significant latent liabilities that may not be discovered before they are acquired and may not be reflected in the price we pay. Acquisitions also could have a dilutive effect on our financial results and while they generally result in goodwill, goodwill could be impaired in the future resulting in a charge to earnings.

Our ability to implement our growth strategy may be limited by our ability to identify appropriate acquisition or joint venture candidates, our financial resources, including available cash and borrowing capacity, and our ability to negotiate and complete suitable arrangements. Further, the success of our growth depends on our ability to navigate risks similar to those listed above and successfully integrate acquisitions, including, but not limited to, our ability to:

- successfully execute the integration or consolidation of the acquired or additional business into existing processes and operations;
- develop or modify financial reporting, information systems and other related financial tools to ensure overall financial integrity and adequacy of internal control procedures;
- identify and take advantage of potential synergies, including cost reduction opportunities, while retaining legacy business and other related attributes;
- adequately address challenges arising from the increased scope, geographic diversity and complexity of our operations; and
- further penetrate existing, and expand into new, markets with the product capabilities acquired in acquisitions.

If we fail to successfully integrate acquisitions into our existing business, our financial condition and results of operations could be adversely affected. We may fail to obtain the benefits we anticipate from the Combination or our other recently completed or future acquisitions or joint ventures and we may not create the appropriate infrastructure to support such additional growth from organic or acquired businesses, which could also have a material adverse effect on our liquidity, financial position and results of operations.

Gulf and its wholly-owned subsidiary, QH Hungary Holdings Limited, have a significant minority stake in the Company and the contractual ability to nominate certain directors of the Company, which may enable them to influence the direction of our business and significant corporate decisions.

As a result of the Combination, Gulf and its wholly-owned subsidiary, QH Hungary Holdings Limited (together, the "Gulf Affiliates"), have become our largest shareholders. Subject to certain restrictions over timing and amount of sales in the shareholders agreement they have entered into with the Company, if they were to make available for sale a portion of their shares, that portion could represent a significant amount of common stock of the Company being sold which could have an adverse impact on the Company's stock price.

In addition, the Gulf Affiliates currently have the right to designate three individuals for election to our board of directors (the "Board") and this right, together with their share ownership, gives them substantial influence over our business, including over matters submitted to a vote of our shareholders, including the election of directors, amendment of our organizational documents, acquisitions or other business combinations involving the Company, and potentially the ability to prevent extraordinary transactions such as a takeover attempt or business combination. The concentration of ownership of our shares held by the Gulf Affiliates may make some future actions more difficult without their support. The Gulf Affiliates, however, among other provisions in the shareholders agreement, have agreed that for so long as any of their designees are on the Board, and for six months thereafter, they will vote all Quaker Houghton shares consistent with the recommendations of the Board for each director nominee as reflected in each proxy statement of the Company, including in support of any Quaker Houghton directors nominated for election or re-election to the Board (except as would conflict with their rights to designees on the Board). Nevertheless, the interests of Gulf may conflict with our interests or the interests of our other shareholders, though we are not aware of any such existing conflicts of interest at this time.

Failure to comply with any material provision of our principal credit facility or other debt agreements could have a material adverse effect on our liquidity, financial position and results of operations.

We significantly increased our level of indebtedness in connection with the closing of the Combination. Our principal credit facility requires the Company to comply with certain provisions and covenants, and, while we do not currently consider these provisions and covenants to be overly restrictive, they could become more difficult to comply with as business or financial conditions change. We will also be subject to interest rate risk due to the variable interest rates within the credit facility and if interest rates rise significantly, these interest costs would increase as well.

Our principal credit facility contains provisions that are customary for facilities of its type, including affirmative and negative covenants, financial covenants and events of default, including restrictions on (a) the incurrence of additional indebtedness, (b) investments in and acquisitions of other businesses, lines of business and divisions, (c) the making of dividends or capital stock purchases and (d) dispositions of assets. We may declare dividends and make share repurchases in annual amounts not exceeding the greater of $50 million annually and 20% of consolidated EBITDA (earnings before interest, taxes, depreciation and amortization) if we are otherwise in compliance with the credit facility and we may also distribute certain other amounts to our shareholders if we satisfy a consolidated net leverage ratio. Other financial covenants contained in our principal credit facility include a consolidated interest coverage test and a consolidated net leverage test. Customary events of default in the credit facility include, among others, defaults for non-payment, breach of representations and warranties, non-performance of covenants, cross-defaults, insolvency, and a change of control of the Company in certain circumstances. If we are unable to comply with the financial and other provisions of our principal facility, we could become in default. The occurrence of an event of default under the credit facility could result in all loans and other obligations becoming immediately due and payable and the facility being terminated. In addition, deterioration in the Company's results of operations or financial position could significantly increase borrowing costs.

Changes to the LIBOR calculation method or the replacement of LIBOR may have adverse consequences for the Company that cannot yet reasonably be predicted.

The Company's principal credit facility permits interest on certain borrowings to be calculated based on LIBOR. The LIBOR benchmark has been subject of national, international, and other regulatory guidance and proposals for reform and is currently expected to be discontinued after 2021. The transition away from LIBOR presents various risks and challenges, including with respect to our borrowings and hedging arrangements that rely on the LIBOR benchmark. Further, the overall financial market may be disrupted as a result of the phase-out or replacement of LIBOR. Various parties are working on industry wide and company specific transition plans related to derivatives and cash markets exposed to LIBOR. The U.S. Federal Reserve, in conjunction with the Alternative Reference Rates Committee, a steering committee comprised of large U.S. financial institutions, is considering replacing LIBOR with the Secured Overnight Financing Rate ("SOFR"), a new index calculated using short-term repurchase agreements, backed by Treasury securities. At this time, the future of LIBOR remains uncertain. It is not possible to predict whether SOFR will attain market traction as a LIBOR replacement or to predict any other reforms to LIBOR that may be enacted. The potential effect of the phase-out or replacement of LIBOR on the Company's financial position or results of operations cannot yet be predicted, but we do not believe it would have a material adverse impact on the financial results of the Company.

Risks Related to our International Operations

Our global presence subjects us to political and economic risks that could adversely affect our business, liquidity, financial position and results of operations.

A significant portion of our revenues and earnings are generated by non-U.S. operations. Our success as a global business will depend, in part, upon our ability to succeed across different legal, regulatory, economic, social and political conditions by developing, implementing and maintaining policies and strategies that are effective in all of the locations where we do business. Risks inherent in our global operations include:

- increased transportation and logistics costs, or transportation may be restricted;
- increased cost or decreased availability of raw materials;
- trade protection measures including import and export controls, trade embargoes, and trade sanctions between countries or regions we serve that could result in our losing access to customers and suppliers in those countries or regions;
- unexpected adverse changes in export duties, quotas and tariffs and difficulties in obtaining export licenses;
- termination or substantial modification of international trade agreements that may adversely affect our access to raw materials and to markets for our products;
- our agreements with counterparties in countries outside the U.S. may be difficult for us to enforce and related receivables may take longer or be difficult for us to collect;
- difficulties of staffing and managing dispersed international operations;
- less protective foreign intellectual property laws, and more generally, legal systems that may be less developed and predictable than those in the U.S.;
- limitations on ownership or participation in local enterprises as well as the potential for expropriation or nationalization of enterprises;
- the impact of widespread public health crises, such as the COVID-19 pandemic;
- instability in or adverse changes to the economic, political, social, legal or regulatory conditions in a country or region where we do business, including hyperinflationary conditions or as a result of terrorist activities; and
- complex and dynamic local tax regulations, including changes in foreign laws and tax rates or U.S. laws and tax rates with respect to foreign income that may unexpectedly increase the rate at which our income is taxed, impose new and additional taxes on remittances, repatriation or other payments by subsidiaries, or cause the loss of previously recorded tax benefits.

The current global geopolitical and trade environment creates the potential for increased escalation of domestic and international tariffs and retaliatory trade policies. Further changes in U.S. trade policy and additional retaliatory actions by U.S. trade partners could result in a worsening of economic conditions. If we are unable to successfully manage these and other risks associated with our international businesses, the risks could have a material adverse effect on our business, results of operations or financial condition.

Additionally, on January 31, 2020, the United Kingdom's ("U.K.") ended its membership in the European Union ("EU") (commonly referred to as "Brexit"). The U.K. and the EU entered into a trade and cooperation agreement effective January 1, 2021, but uncertainty remains regarding its implications and implementation, and whether any new trade agreements with other countries or territories will be agreed upon and implemented and how any such agreements may impact our business. The long-term economic, legal, political and social implications of Brexit, including regarding data protection in the U.K. and the free movement of goods, services, and people between the U.K., the EU, and elsewhere, also remains unclear. Brexit has caused and could cause further disruptions to, and create uncertainty surrounding, our business in the U.K. and EU, including affecting our relationships with our existing and future customers, suppliers and employees. Brexit could lead to legal uncertainty and potentially divergent national laws and regulations as the U.K. determines which EU laws to replace or replicate. Brexit could also lead to calls for similar referendums in other European jurisdictions which could cause increased economic volatility in the European and global markets. Uncertainty around these and related issues could lead to adverse effects on the economy of the U.K. or in the other economies in which we operate. There can be no assurance that any or all of these events will not have a material adverse effect on our business operations, results of operations and financial condition.

The scope of our international operations subjects us to risks from currency fluctuations that could adversely affect our liquidity, financial position and results of operations.

Our non-U.S. operations generate significant revenues and earnings. Fluctuations in foreign currency exchange rates may affect product demand and may adversely affect the profitability in U.S. dollars of the products and services we provide in international markets where payment for our products and services is made in the local currency. Our financial results are affected by currency fluctuations, particularly between the U.S. dollar and the euro, the Brazilian real, the Mexican peso, the Chinese renminbi, and the Indian rupee, and the impact of those currency fluctuations on the underlying economies. During the past three years, sales by our non-U.S. subsidiaries, which use their local currencies as their functional currency, accounted for approximately 60% to 70% of our consolidated net sales. We generally do not use financial instruments that expose us to significant risk involving foreign currency transaction; however, the relative size of our non-U.S. activities has a significant impact on reported operating results and our net assets. Therefore, as exchange rates change, our results can be materially affected. Incorporated by reference is the foreign exchange risk information contained in Item 7A of this Report and the geographic information in Note 4 of Notes to Consolidated Financial Statements included in Item 8 of this Report.

Also, we occasionally source inventory in a different country than that of the intended sale. This practice can give rise to foreign exchange risk. We seek to mitigate this risk through local sourcing of raw materials in the majority of our locations.

Risks Relating to Our Supply Chain

If we are unable to obtain price increases or contract concessions sufficient to offset increases in the costs of raw materials, this could result in a loss of sales, gross profit, and/or market share and could have a material adverse effect on our liquidity, financial position and results of operations. Conversely, if we fail to adjust prices in a declining raw material cost environment, we could lose sales, gross profit, and/or market share which could have a material adverse effect on our liquidity, financial position and results of operations.

Quaker Houghton uses approximately 3,000 different raw materials, including animal fats, vegetable oils, mineral oils, oleochemicals, ethylene, solvents, surfactant agents, various chemical compounds that act as additives to our base formulations, and a wide variety of other organic and inorganic compounds, and various derivatives of the foregoing. The price of mineral oils and their derivatives can be affected by the price of crude oil and industry refining capacity. Animal fat and vegetable oil prices, as well as the prices of other raw materials, are impacted by their own specific supply and demand factors, as well as by biodiesel consumption which is also affected by the price of crude oil. Accordingly, significant fluctuations in the price of crude oil in the past have had and are expected to continue to have a material impact on the cost of our raw materials. In addition, many of the raw materials we use are commodity chemicals, which can experience significant price volatility.

We generally attempt to pass through changes in the prices of raw materials to our customers, but we may be unable to do so (or may be delayed in doing so). In addition, raising prices we charge to our customers in order to offset increases in the prices we pay for raw materials could cause us to suffer a loss of sales volumes. Although we have been successful in the past in recovering a substantial amount of raw material cost increases while retaining our customers, there can be no assurance that we will be able to continue to offset higher raw material costs or retain customers in the future. A significant change in margin or the loss of customers due to pricing actions could result in a material adverse effect on our liquidity, financial position, and results of operations.

Lack of availability of raw materials and issues associated with sourcing from single suppliers and suppliers in volatile economic environments could have a material adverse effect on our liquidity, financial position, and results of operations.

The specialty chemical industry periodically experiences supply shortages for certain raw materials. In addition, we source some materials from a single supplier or from suppliers in jurisdictions that have experienced political or economic instability. Even if we have multiple suppliers of a particular raw material, there are occasionally shortages. Any significant disruption in supply could affect our ability to obtain raw materials or satisfactory substitutes or could increase the cost of such raw materials or substitutes, which could have a material adverse effect on our liquidity, financial position and results of operations. In addition, certain raw materials that we use are subject to various regulatory laws, and a change in our ability to legally use such raw materials may impact the products or services we are able to offer which could negatively affect our ability to compete and could adversely affect our liquidity, financial position and results of operations.

Loss of a significant manufacturing facility or disruptions within our supply chain or in transportation could have a material adverse effect on our liquidity, financial position and results of operations.

Our manufacturing facilities are located throughout the world. While we have some redundant capabilities, if one of our facilities is forced to shut down or curtail operations because of damage or other factors, including natural disasters, labor difficulties or widespread public health crises, such as the ongoing COVID-19 pandemic, we may not be able to timely supply our customers. This could result in a loss of sales over an extended period or permanently. While the Company seeks to mitigate this risk through business continuity and contingency planning and other measures, the loss of production in any one region over an extended period of time could have a material adverse effect on our liquidity, financial position and results of operations. In addition, the coronavirus pandemic has caused and may in the future cause significant travel disruptions, quarantines and/or closures, which could result in disruptions to our manufacturing and production operations at our facilities, as well as those of our suppliers and customers. Any losses due to these events may not be covered by our existing insurance policies or may be subject to certain deductibles.

We could be similarly adversely affected by disruptions to our supply chain and transportation network. The Company relies heavily on railroads, ships, and over-the-road shipping methods to transport raw materials to its manufacturing facilities and to transport finished products to customers. The costs of transporting our products could be negatively affected by factors outside of our control, including shipping container shortages or global imbalances in shipping capabilities, rail service interruptions or rate increases, extreme weather events, tariffs, rising fuel costs and capacity constraints. Significant delays or increased costs affecting our supply chain could materially affect our financial condition and results of operations. Disruptions at our suppliers could lead to short term or longer term increases in raw material or energy costs and/or reduced availability of materials or energy, potentially affecting our financial condition and results of operations.

Risks Relating to Domestic and Foreign Taxation and Government Regulation and Oversight

Changes in tax laws could result in fluctuations in our effective tax rate and have a material effect on our liquidity, financial position and results of operation.

We pay income taxes in the U.S. and various foreign jurisdictions. Our effective tax rate is derived from a combination of local tax rates and tax attributes applicable to our operations in the various countries, states and other jurisdictions in which we operate. Our effective tax rate and respective tax liabilities could therefore be materially affected by changes in the mix of earnings in countries with differing statutory tax rates, changes in tax rates, expiration or lapses of tax credits or incentives, changes in uncertain tax positions, changes in the valuation of deferred tax assets and liabilities, or changes in tax laws or in how they are interpreted or enforced, including matters such as transfer pricing. One example is the impact of the U.S. Tax Cuts and Jobs Act, enacted in the U.S. in 2017 ("U.S. Tax Reform"). We have made various interpretations and assumptions with regard to uncertainties and ambiguities in the application of certain provisions of U.S. Tax Reform which could turn out to be incorrect. In addition, we are regularly under audit by tax authorities, and the final decisions of such audits could materially affect our current tax estimates and tax positions. See Note 10 and Note 26 of Notes to Consolidated Financial Statements in Item 8 of this Report for a discussion of certain income and non-income tax audits and inspections. Any of these factors or similar tax-related risks could cause our effective tax rate and tax-related payments, including any such payments related to tax liabilities of businesses we have acquired, to significantly differ from previous periods and current or future expectations which could have a material effect on our liquidity, financial position and results of operations.

Pending and future legal proceedings including environmental matters could have a material adverse effect on our liquidity, financial position, and results of operations, as well as our reputation in the markets it serves.

The Company and its subsidiaries are routinely party to proceedings, cases, and requests for information from, and negotiations with, various claimants and federal and state agencies relating to various legal matters, including tax and environmental matters. See Note 10 and Note 26 of Notes to Consolidated Financial Statements in Item 8 of this Report, which describes uncertain tax positions and tax audits and inspections, as well as certain information concerning pending asbestos-related litigation against an inactive subsidiary, amounts accrued associated with certain environmental, non-capital remediation costs and other potential commitments or contingencies. An adverse result in one or more pending or ongoing matters or any potential future matter of a similar nature could materially and adversely affect our liquidity, financial position, and results of operations, as well as our reputation in the markets we serve.

Failure to comply with the complex global regulatory environment in which we operate could have an adverse impact on our reputation and/or a material adverse effect on our liquidity, financial position and results of operations.

We are subject to government regulation in all of the jurisdictions in which we conduct our business. Changes in the regulatory environments in which we operate, particularly, but not limited to, the U.S., Mexico, Brazil, China, India, Thailand, Australia, the U.K. and the EU, could lead to heightened regulatory compliance costs and scrutiny, could adversely impact our ability to continue selling certain products in the U.S. or foreign markets, and/or could otherwise increase the cost of doing business. While we seek to mitigate these risks through a variety of actions, including receiving Responsible Care Certification, ongoing employee training, and employing a comprehensive environmental, health and safety program, there is no guarantee these actions will prevent all potential regulatory compliance issues. For instance, failure to comply with the EU's Registration, Evaluation, Authorization and Restriction of Chemicals ("REACH") regulations or other similar laws and regulations could result in our inability to sell certain products or we could incur fines, ongoing monitoring obligations or other future business consequences, which could have a material adverse effect on our liquidity, financial position and results of operations. In addition, the U.S. Toxic Substances Control Act ("TSCA") requires chemicals to be assessed against a risk-based safety standard and that unreasonable risks identified during risk evaluation be eliminated. This regulation and other pending initiatives at the U.S. state level, as well as initiatives in Canada, Asia and other regions, could potentially require toxicological testing and risk assessments of a wide variety of chemicals, including chemicals used or produced by us. These assessments may result in heightened concerns about the chemicals involved and additional requirements being placed on their production, handling, labeling or use. These concerns and additional requirements could also increase the cost incurred by our customers to use our chemical products and otherwise limit their use which could lead to a decrease in demand for these products. A decrease in demand due to these issues could have an adverse impact on our business and results of operation.

Further, we are subject to the U.S. Foreign Corrupt Practices Act (the "FCPA"), the U.K. Bribery Act and other anti-bribery, anti-corruption and anti-money laundering laws in jurisdictions around the world. The FCPA, the U.K. Bribery Act and similar laws generally prohibit companies and their officers, directors, employees and third-party intermediaries, business partners and agents, from making improper payments or providing other improper items of value to government officials or other persons. While we have policies and procedures and internal controls designed to address compliance with such laws, we cannot guarantee that our employees and third-party intermediaries, business partners and agents will not take, or be alleged to have taken, actions in violation of such policies and laws for which we may be ultimately held responsible. Detecting, investigating and resolving actual or alleged violations can be extensive and require a significant diversion of time, resources and attention from senior management. Any violation of the FCPA, the U.K. Bribery Act or other applicable anti-bribery, anti-corruption and anti-money laundering laws could result in whistleblower complaints, adverse media coverage, investigations, loss of export privileges, and criminal or civil sanctions, penalties and fines, any of which could adversely affect our business and financial condition.

The shipment of goods, services and technology across international borders subjects us to extensive trade laws and regulations. Our import activities are governed by the unique customs laws and regulations in each of the countries where we operate. Moreover, many countries, including the U.S., control the export and re-export of certain goods, services and technology and impose related export record-keeping and reporting obligations. Governments may also impose economic sanctions against certain countries, persons and entities that may restrict or prohibit transactions involving such countries, persons and entities, which may limit or prevent our conduct of business in certain jurisdictions.

The laws and regulations concerning import activity, export record-keeping and reporting, export control and economic sanctions are complex and constantly changing. These laws and regulations can cause delays in shipments and unscheduled operational downtime. Moreover, any failure to comply with applicable legal and regulatory trading obligations could result in criminal and civil penalties and sanctions such as fines, imprisonment, debarment from governmental contracts, seizure of shipments and loss of import and export privileges. In addition, investigations by governmental authorities as well as legal, social, economic and political issues in these countries could have a material adverse effect on our business, results of operations and financial condition. We are also subject to the risks that our employees, joint venture partners and agents outside of the U.S. may fail to comply with other applicable laws.

Uncertainty related to environmental regulation and industry standards relating to, as well as physical risks of, climate change and biodiversity loss, could impact our results of operations and financial position.

Increased public and stakeholder awareness and concern regarding global climate change, biodiversity loss, and other environmental risks may result in more extensive international, regional and/or federal requirements or industry standards to reduce or mitigate the effects of these changes. These regulations could mandate even more restrictive standards or industry standards than the voluntary goals that we have established or require changes to be adopted on a more accelerated time frame. There continues to be a lack of consistent climate legislation, which creates economic and regulatory uncertainty. For example, the new U.S. presidential administration has issued Executive Orders seeking to adopt new regulations and policies to address climate change and to suspend, revise, or rescind prior agency actions that are identified as conflicting with the administration’s climate policies. The new presidential administration also announced that in February 2021, the U.S. will formally re-join the Paris Agreement. The Paris Agreement requires countries to review and “represent a progression” in their intended nationally determined contributions which set greenhouse gas emission reduction goals every five years. Though we are closely following developments in this area and changes in the regulatory landscape in the U.S., we cannot predict how or when those challenges may ultimately impact our business. While certain climate change initiatives may result in new business opportunities for us in the area of alternative fuel technologies and emissions control, compliance with these initiatives may also result in additional costs to us including, among other things, increased production costs, additional taxes, reduced emission allowances or additional restrictions on production or operations.

In addition, the potential physical impacts of climate change and biodiversity loss are highly uncertain and will be particular to the circumstances developing in various geographical regions. These may include extreme weather events and long-term changes in temperature levels and water availability as well as damaged ecosystems. The physical risks of climate change and biodiversity loss may impact our facilities, our customers and suppliers, and the availability and costs of materials and natural resources, sources and supply of energy, product demand and manufacturing. In particular, climate change serves as a risk multiplier increasing both the frequency and severity of natural disasters that may affect our business operations.

If environmental laws or regulations or industry standards are either changed or adopted and impose significant operational restrictions and compliance requirements upon us or our products, or our operations are disrupted due to physical impacts of climate change or biodiversity loss, our business, capital expenditures, results of operations, financial condition and competitive position could be negatively impacted.

We are subject to stringent labor and employment laws in many jurisdictions in which we operate, and our relationship with our employees could deteriorate which could adversely impact our operations.

A majority of our full-time employees are employed outside the U.S. In many jurisdictions where we operate, labor and employment laws grant significant job protection to certain employees including rights on termination of employment. In addition, in certain countries our employees are represented by works councils or are governed by collective bargaining agreements. We are often required to consult with and seek the consent or advice of works councils or labor unions. These regulations and laws, together with our obligations to seek consent or consult with the relevant unions or works councils, could have a significant impact on our flexibility in managing costs and responding to market changes. While the Company believes it has generally positive relations with its labor unions and employees, there is no guarantee the Company will be able to successfully negotiate new or renew labor agreements without work stoppages, labor difficulties or unfavorable terms. If we were to experience any extended interruption of operations at any of our facilities because of strikes or other work stoppages, our results of operations and financial condition could be materially and adversely affected.

We may be unable to adequately protect our proprietary rights and trade brands, which may limit our ability to compete in our markets and could adversely affect our liquidity, financial position and results of operations.

We have a limited number of patents and patent applications, including patents issued, applied for, or acquired in the U.S. and in various foreign countries, some of which are material to our business. However, we rely principally on our proprietary formulae and the applications know-how and experience to meet customer needs. Also, our products are identified by trademarks that are registered throughout our marketing area. Despite our efforts to protect our proprietary information through patent and trademark filings, and the use of appropriate trade secret protections, it is possible that competitors or other unauthorized third parties may obtain, copy, use, disclose or replicate our formulae, products, and processes. Similarly, third parties may assert claims against us and our customers and distributors alleging our products infringe upon third-party intellectual property rights. In addition, the laws and/or judicial systems of foreign countries in which we design, manufacture, market and sell our products may afford little or no effective protection of our proprietary technology or trade brands. Also, security over our global information technology structure is subject to increasing risks associated with cyber-crime and other related cyber-security threats. These potential risks to our proprietary information, trade brands and other intellectual property could subject us to increased competition and a failure to protect, defend or enforce our intellectual property rights could negatively impact our liquidity, financial position and results of operations.

General Risk Factors

Our business could be adversely affected by environmental, health and safety laws and regulations or by potential product, service or other related liability claims.

The development, manufacture and sale of specialty chemical products and other related services involve inherent exposure to potential product liability claims, service level claims, product recalls and related adverse publicity. Some customers have and may in the future require us to represent that our products conform to certain product specifications provided by them. Any failure to comply with such specifications could result in claims or legal action against us. Any of the foregoing potential product or service risks could also result in substantial and unexpected expenditures and affect customer confidence in our products and services, which could have a material adverse effect on our liquidity, financial position and results of operations.

In addition, our business is subject to hazards associated with the manufacturing, handling, use, storage, and transportation of chemical materials and products, including historical operations at our current and former facilities. These potential hazards could cause personal injury and loss of life, severe damage to, or destruction of, property or equipment and environmental contamination or other environmental damage, which could have an adverse effect on our business, financial condition or results of operations. In the jurisdictions in which we operate, we are subject to numerous U.S. and non-U.S. national, federal, state and local environmental, health and safety laws and regulations, including those governing the discharge of pollutants into the air and water, the management and disposal of hazardous substances and wastes and the cleanup of contaminated properties. We currently use, and in the past have used, hazardous substances at many of our facilities, and we have in the past been, and may in the future be, subject to claims relating to exposure to hazardous materials. We also have generated, and continue to generate, hazardous wastes at a number of our facilities. Liabilities associated with the investigation and cleanup of hazardous substances, as well as personal injury, property damages or natural resource damages arising from the release of, or exposure to, such hazardous substances, may be imposed in many situations without regard to violations of laws or regulations or other fault, and may also be imposed jointly and severally (so that a responsible party may be held liable for more than its share of the losses involved, or even the entire loss). These liabilities may also be imposed on many different entities, including, for example, current and prior property owners or operators, as well as entities that arranged for the disposal of the hazardous substances. The liabilities may be material and can be difficult to identify or quantify. In addition, the occurrence of disruptions, shutdowns or other material operating problems at our facilities or those of our customers due to any of these risks could adversely affect our reputation and have a material adverse effect on our operations as a whole, including our results of operations and cash flows, both during and after the period of operational difficulties.

Further, some of the raw materials we handle are subject to government regulation. These regulations affect the manufacturing processes, handling, uses and applications of our products. In addition, our production facilities and a number of our distribution centers require numerous operating permits. Due to the nature of these requirements and changes in our operations, our operations may exceed limits under permits or we may not have the proper permits to conduct our operations.

Ongoing compliance with environmental laws, regulations and permits that impact registration/approval requirements, transportation and storage of raw materials and finished products, and storage and disposal of wastes could require us to make changes in manufacturing processes or product formulations and could have a material adverse effect on our results of operations. We may incur substantial costs, including fines, damages, criminal or civil sanctions and remediation costs, or experience interruptions in our operations, including as a result of revocation, non-renewal or modification of the Company’s operating permits and revocation of the Company’s product registrations, for violations arising under these laws or permit requirements. Any such revocation, modification or non-renewal may require the Company to cease or limit the manufacture and sale of its products at one or more of its facilities, which may limit or prevent the Company’s ability to meet product demand or build new facilities and may have a material adverse effect on the Company’s business, financial position, results of operations and cash flows. Additional information may arise in the future concerning the nature or extent of our liability with respect to identified sites, and additional sites may be identified for which we are alleged to be liable, that could cause us to materially increase our environmental accrual or the upper range of the costs we believe we could reasonably incur for such matters. Increased compliance costs may not affect competitors in the same way that they affect us due to differences in product formulations, manufacturing locations or other factors, and we could be at a competitive disadvantage, which might adversely affect our financial performance.

We could be subject to indemnity claims and liable for other payments relating to properties or businesses we have divested.

In connection with the sale of certain properties and businesses, we agreed to indemnify the purchasers of such properties for certain types of matters, such as certain breaches of representations and warranties, taxes and certain environmental matters. With respect to environmental matters, the discovery of contamination arising from properties that we have divested may expose us to indemnity obligations under the sale agreements with the buyers of such properties or cleanup obligations and other damages under applicable environmental laws, even if we were not aware of the contamination. We may not have insurance coverage for such indemnity obligations. Further, we cannot predict the nature of and the amount of any indemnity or other obligations we may have to the applicable purchaser. These payments may be costly and may adversely affect our financial condition and results of operations.

Our insurance may not fully cover all potential exposures.

We maintain product, property, business interruption, casualty, and other general liability insurance, but this may not cover all risks associated with the hazards of our business and these coverages are subject to limitations, including deductibles and coverage limits. We may incur losses beyond the limits, or outside the coverage, of our insurance policies, including liabilities for environmental remediation. In addition, from time to time, various types of insurance for companies in the specialty chemical industry have not been available on commercially acceptable terms and, in some cases, have not been available 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 of our 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.

Impairment evaluations of goodwill, intangible assets, investments or other long-lived assets could result in a reduction in our recorded asset values which could have a material adverse effect on our financial position and results of operation.

We perform reviews of goodwill and indefinite-lived intangible assets on an annual basis, or more frequently if triggering events indicate a possible impairment. We test goodwill at the reporting unit level by comparing the carrying value of the net assets of the reporting unit, including goodwill, to the reporting unit's fair value. Similarly, we test indefinite-lived intangible assets by comparing the fair value of the assets to their carrying values. If the carrying values of goodwill or indefinite-lived intangible assets exceed their fair value, the goodwill or indefinite-lived intangible assets would be considered impaired. In addition, we perform a review of a definite-lived intangible asset or other long-lived asset when changes in circumstances or events indicate a possible impairment. If any impairment or related charge is warranted, then our financial position and results of operations could be materially affected. See Note 16 of Notes to Consolidated Financial Statements included in Item 8 of this Report.

Disruption of critical information systems or material breaches in the security of our systems could adversely affect our business and our customer relationships, and subject us to fines or other regulatory actions.

We rely on information technology systems to obtain, process, analyze, manage, transmit, and store electronic information in our day-to-day operations. We also rely on our technology infrastructure in all aspects of our business, including to interact with customers and suppliers, fulfill orders and bill, collect and make payments, ship products, provide support to customers, and fulfill contractual obligations. Our information technology systems are subject to potential disruptions, including significant network or power outages, cyberattacks, computer viruses, other malicious codes, and/or unauthorized access attempts, any of which, if successful, could result in data leaks or otherwise compromise our confidential or proprietary information and disrupt our operations. Security breaches could result in unauthorized disclosure of confidential information or personal data belonging to our employees, partners, customers or suppliers for which we may incur liability. Cybersecurity incidents, such as these, are becoming more sophisticated and frequent, and there can be no assurance that our protective measures will prevent security breaches that could have a significant impact on our business, reputation and financial results.

We are subject to the data privacy and protection laws and regulations adopted by federal, state and foreign legislatures and governmental agencies in various countries in which we operate, including the EU General Data Protection Regulation. Implementing and complying with these laws and regulations may be more costly or take longer than we anticipate, or could otherwise affect our business operations.

Breaches, cyber incidents and disruptions, or failure to comply with laws and regulations related to information security or privacy could result in legal claims or proceedings against us by governmental entities or individuals, significant fines, penalties or judgements, disruption of our operations, remediation requirements, changes to our business practices, and damage to our reputation. Therefore, a failure to monitor, maintain or protect our information technology systems and data integrity effectively or to anticipate, plan for and recover from significant disruptions to these systems could have a material adverse effect on our business, results of operations or financial condition.

Our business depends on attracting and retaining qualified management and other key personnel.

Due to the specialized and technical nature of our business, our future performance is dependent on our ability to attract, develop and retain qualified management, commercial, technical, and other key personnel. Competition for such personnel is intense, and we may be unable to continue to attract or retain such personnel. In an effort to mitigate such risks, the Company utilizes retention bonuses, offers competitive pay and maintains continuous succession planning, including for our senior executive officers. However, there can be no assurance that these mitigating factors will be adequate to attract or retain qualified management or other key personnel. Failure to retain key employees could also adversely affect our ability to complete the integration of the Combination.

Increasing scrutiny and changing expectations from stakeholders with respect to our environmental, social and governance ("ESG") practices may impose additional costs on us or expose us to new or additional risks.

Companies across all industries are facing increasing scrutiny from stakeholders related to their ESG practices. Investor advocacy groups, certain institutional investors, investment funds, and other influential investors are also increasingly focused on ESG practices and in recent years have placed increasing importance on the implications and social cost of their investments. Regardless of the industry, investors' increased focus and activism related to ESG and similar matters may impact access to capital, as investors may decide to reallocate capital or to not commit capital as a result of their assessment of a company's ESG practices.

We face pressures from certain stakeholders to prioritize and promote sustainable practices and reduce our carbon footprint. Our stakeholders may pressure us to implement ESG procedures or standards beyond those we have in place in order to continue engaging with us, to remain invested in us, or before they will make further investments in us. Additionally, we may face reputational challenges in the event our ESG procedures or standards do not meet the standards set by certain constituencies. We have adopted certain practices as highlighted in the Company's Sustainability Report, including with respect to environmental stewardship.

Further, as we work to align with the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures and the Sustainability Accounting Standards Board, we continue to expand our disclosures in these areas. This is consistent with our commitment to executing on a strategy that reflects the economic, social, and environmental impact we have on the world while advancing and complementing our business strategy. Our disclosures on these matters and standards we set for ourselves or a failure to meet these standards, may influence our reputation and the value of our brand. It is possible that our stakeholders might not be satisfied with our ESG efforts or the speed of their adoption. If we do not meet our stakeholders' expectations, our business and/or our ability to access capital could be harmed. Any harm to our reputation resulting from setting these standards or our failure or perceived failure to meet such standards could adversely affect our business, financial performance, and growth.

Additionally, adverse effects upon our customers' industries related to the worldwide social and political environment, including uncertainty or instability resulting from climate change or biodiversity loss, changes in political leadership and environmental policies, changes in geopolitical-social views toward fossil fuels and renewable energy, concern about the environmental impact of climate change or biodiversity loss, and investors' expectations regarding ESG matters, may also adversely affect demand for our services. Any long-term material adverse effect on our customers or their industries could have a significant financial and operational adverse impact on our business.

Terrorist attacks, other acts of violence or war, natural disasters, widespread public health crises or other uncommon global events may affect the markets in which we operate and our profitability which could adversely affect our liquidity, financial position and results of operations.

Terrorist attacks, other acts of violence or war, natural disasters, widespread public health crises, including the ongoing COVID-19 pandemic, or other uncommon global events may negatively affect our operations. There can be no assurance that there will not be terrorist attacks against the U.S. or other locations where we do business. Also, other uncommon global events such as earthquakes, hurricanes, fires and tsunamis cannot be predicted.

Terrorist attacks, other acts of violence or armed conflicts, and natural disasters, which may be amplified by ongoing global climate change and biodiversity loss, may directly impact our physical facilities and/or those of our suppliers or customers. In addition, terrorist attacks or natural disasters may disrupt the global insurance and reinsurance industries with the result that we may not be able to obtain insurance at historical terms and levels, if at all, for all of our facilities. In addition, available insurance coverage may not be sufficient to cover all of the damage incurred or, if available, may be prohibitively expensive. Widespread public health crises could also disrupt operations of the Company, its suppliers and customers which could have a material adverse impact on our results of operations.

For example, refer to "The COVID-19 pandemic and its impact on business and economic conditions have negatively affected our business, results of operations and financial condition and the extent and duration of those effects is uncertain," included in this "Risk Factors" section. The consequences of terrorist attacks, other acts of violence or armed conflicts, natural disasters, widespread public health crises or other uncommon global events can be unpredictable, and we may not be able to foresee or effectively plan for these events, resulting in a material adverse effect on our business, results of operations or financial condition.

The COVID-19 pandemic and its impact on business and economic conditions have negatively affected our business, results of operations and financial condition and the extent and duration of those effects is uncertain.

The COVID-19 pandemic that began in the first quarter of 2020 and the resulting impacts significantly disrupted the global economy and financial markets and adversely affected the Company's operations as well as those of its suppliers and customers. The pandemic and its impacts adversely affected the Company's results of operations and financial condition in 2020 and the adverse effects have continued into 2021. The Company initially experienced disruptions as a result of COVID-19 at its China subsidiaries and subsequently throughout the rest of the business due to the global economic slowdown that ensued and continues. We have experienced, and may experience in the future, temporary site or facility closures at our own facilities or those of our customers in response to illness or government mandates in some of the jurisdictions in which we operate. Even in facilities that are not closed, we could be affected by reductions in employee availability and productivity, changes in operating procedures, and increased costs. The Company anticipates that its future results of operations may continue to be adversely impacted by COVID-19 until effective vaccines have been widely administered. In particular, the spread of COVID-19 and efforts to contain the virus have:

- reduced the demand for our products and services as many customers have reduced production levels;
- driven declines in volume and net sales across all reportable segments;
- required us to adjust certain of our facility operating procedures and to take steps to reduce costs and preserve liquidity; and
- negatively affected the estimated fair value of certain of the Company's reporting units or other indefinite-lived or long-lived assets, namely the Company's Houghton and Fluidcare trademarks and tradename indefinite-lived intangible assets, such that their estimated fair values were less than their carrying values and required adjustments.

These effects are likely to increase or become exacerbated the longer the crisis continues, and the pandemic in the future could (or, in some instances, could further):

- limit the availability and reduce the productivity of our employees;
- challenge our financial reporting systems and processes, internal control over financial reporting, and disclosure controls and procedures, including our ability to ensure that information required to be disclosed in our reports under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our chief executive officer and chief financial officer, to allow for timely decisions regarding required disclosure;
- present challenges as a result of travel restrictions and remote work arrangements, including, as further described in Item 9A of this Report, impacting the planning, execution and timing of the Company's remediation and integration plan activities, including the implementation of new or enhanced business process and information technology general controls, as necessary, as well as impacting the timing of the Company's on-going enterprise resource planning system implementations;
- increase our costs as a result of emergency measures that we may take or that may be imposed on us by regulatory authorities;
- cause a delay in customer payments or cause a deterioration of the credit quality of other counterparties that could result in credit losses or force both customer and supplier bankruptcies;
- cause delays and disruptions in the availability of and timely delivery of materials and components used in our operations;
- cause us to breach covenants in our existing credit facility, including covenants regarding our consolidated interest coverage ratio and consolidated net leverage ratio, or increase our cost of capital or make additional capital, including the refinancing of our existing credit facility, more difficult or available only on terms less favorable to us;
- impact our liquidity position and cost of and ability to access funds from financial institutions and capital markets;
- negatively affect the estimated fair values of the Company's reporting units or other indefinite-lived or long-lived assets; and
- cause other risks to impact us, including the other risks described in this "Risk Factors" section.

Although we have implemented business continuity and emergency response plans as well as health and safety measures to permit us to continue to provide services and products to customers and support our operations, there can be no assurance that the continued spread of COVID-19 and efforts to contain the virus (including, but not limited to, voluntary and mandatory quarantines, restrictions on travel, limiting gatherings of people, reduced operations and extended closures of many businesses and institutions) will not further impact our business, results of operations and financial condition. However, given the unprecedented and continually evolving developments with respect to this pandemic, the Company cannot, as of the date of this Report, reasonably estimate the full extent of the impact to its future results of operations or to the ability of it or its customers to resume more normal operations. A further prolonged outbreak or resurgence and period of continued restrictions on day-to-day life and business operations would likely result in volume declines and lower net sales into 2021 periods as well.

The ultimate significance of COVID-19 impacts on our business will depend on, among other things, the extent and duration of the pandemic, the severity of the disease and the number of people infected with the virus, the development and continued uncertainty regarding availability, administration and long-term efficacy of a vaccine or other treatments, including on new strains or mutations of the virus, the longer-term effects on the economy, including market volatility, and the measures taken by governmental authorities and other third parties restricting day-to-day life and the length of time that such measures remain in place, as well as laws and other governmental programs implemented to address the pandemic or assist impacted businesses, such as fiscal stimulus and other legislation designed to deliver monetary aid and other relief.

Epidemic diseases could negatively affect various aspects of our business, make it more difficult to meet our obligations to our customers, and could result in reduced demand from our customers. These could have a material adverse effect on our business, financial condition, results of operations, or cash flows.

Our business could be adversely affected by the effects of a widespread outbreak of contagious disease, similar to the COVID-19 impacts described above. A significant outbreak of contagious diseases in the human population could result in a widespread health crisis that could adversely affect the economies and financial markets of many countries, resulting in an economic downturn that could affect demand for our products and likely impact our operating results. To the extent that the Company's customers and suppliers are materially and adversely impacted by a widespread outbreak of contagious disease, this could reduce the availability, or result in delays, of materials or supplies to or from the Company, which in turn could materially interrupt the Company's business operations.

We have identified material weaknesses in our internal control over financial reporting that could, if not remediated, result in material misstatements in our financial statements and in the inability of our independent registered public accounting firm to provide an unqualified audit opinion which could have a material adverse effect on us.

As a public company, we are required to comply with the SEC's rules implementing Sections 302 and 404 of the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, which require management to certify financial and other information in our quarterly and annual reports and provide an annual management report on the effectiveness of controls over financial reporting.

As disclosed under "Item 9A. Controls and Procedures" of this Report, during the course of preparing our audited financial statements for the Company's annual report on Form 10-K (the "2019 Form 10-K"), we, in conjunction with our independent registered public accounting firm, identified certain material weaknesses as of December 31, 2019. A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of annual or interim financial statements will not be prevented or detected on a timely basis.

We identified certain deficiencies in our application of the principles associated with the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control—Integrated Framework (2013) that management concluded constituted a material weakness. We did not design and maintain effective controls in response to the risks of material misstatement. Specifically, changes to existing controls or the implementation of new controls were not sufficient to respond to changes to the risks of material misstatement in financial reporting as a result of becoming a larger, more complex global organization due to the Combination. This material weakness also contributed to an additional material weakness as we did not design and maintain effective controls over the review of pricing, quantity and customer data to verify that revenue recognized was complete and accurate.

During 2020, management began developing its full remediation plan and executing what will be a multi-step remediation process to completely and fully remediate its identified material weaknesses as further described in Item 9A of this Report. However, the Company has not yet remediated the previously identified material weakness over the review of pricing, quantity and customer data to verify that revenue recognized was complete and accurate as of December 31, 2020, and as a result, the Company also did not remediate the previously identified material weakness related to risk assessment. Until the remediation plans are deemed effective, we cannot assure you that our actions will adequately remediate these material weaknesses or that additional material weaknesses in our internal controls will not be identified in the future. Although the Company expects to be able to remedy these material weaknesses during 2021, it may be unable to do so due to the impact of the COVID-19 pandemic or for other reasons, in which case we would continue to be subject to the risk that a material misstatement of annual or interim financial statements will not be prevented or detected on a timely basis. Any failure to identify and correct material weaknesses in a timely manner could have a material adverse effect on the financial condition of the Company.

As a result of these material weaknesses, management determined that both our disclosure controls and procedures and internal control over financial reporting were not effective as of December 31, 2020 and our independent registered public accounting firm likewise issued an opinion indicating that we had not maintained effective internal control over financial reporting as of December 31, 2020.

Because these control deficiencies could have resulted in misstatements of interim or annual consolidated financial statements and disclosures that could have resulted in a material misstatement that would not be prevented or detected, we performed additional analysis and procedures to ensure that our consolidated financial statements presented in this Annual Report on Form 10-K were prepared in accordance with GAAP and fairly reflected our financial position and results of operations as of and for the year ended December 31, 2020. Subsequently, notwithstanding these material weaknesses, the Company has concluded that these control deficiencies did not result in a misstatement to the related balances and disclosures for the year ended December 31, 2020.

Our management, including our chief executive officer and chief financial officer, does not expect that our internal control over financial reporting will prevent all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Controls can be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the controls. Over time, controls may become inadequate because of changes in circumstances or deterioration in the degree of compliance with policies or procedures may occur. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and may not be detected.

Item 1B. ***Unresolved Staff Comments.***

None.

Item 2. ***Properties.***

Quaker Houghton's corporate headquarters and a laboratory facility are located in its Americas segment's Conshohocken, Pennsylvania location. The Company's other principal facilities in its America's segment are located in Detroit, Michigan; Middletown, Ohio; Dayton, Ohio; Strongsville, Ohio; Carrollton, Georgia; Zion, Illinois; Waterloo, Ontario; Monterrey, N.L., Mexico; Rio de Janeiro, Brazil and Sao Paulo, Brazil. The Company's EMEA segment has principal facilities in Uithoorn, The Netherlands; Manchester, U.K.; Dortmund, Germany; Barcelona, Spain; Navarra, Spain; Karlshamn, Sweden; Tradate, Italy; and Turin, Italy. The Company's Asia/Pacific segment operates out of its principal facilities located in Qingpu, China; Songjiang, China; Kolkata, India; Rayong, Thailand; Sydney, Australia; and Moorabbin, Australia. The Company's Global Specialty Businesses segment operates out of its principal facilities in Aurora, Illinois; Santa Fe Springs, California; Batavia, New York; Zion, Illinois; and Coventry, U.K.. With the exception of the Conshohocken, Santa Fe Springs, Aurora, Karlshamn, Rayong, Coventry, and Sydney sites, which are leased, the remaining principal facilities are owned by the Company and, as of December 31, 2020, were mortgage free. Quaker Houghton also leases sales, laboratory, manufacturing, and warehouse facilities in other locations.

Quaker Houghton's principal facilities consist of various manufacturing, administrative, warehouse, and laboratory buildings. Substantially all of the buildings are of fire-resistant construction and are equipped with sprinkler systems. The Company has a program to identify needed capital improvements that are implemented as management considers necessary or desirable. Most locations have raw material storage tanks, ranging from 1 to 200 at each location with capacities ranging from 1,000 to 82,000 gallons, and processing or manufacturing vessels ranging in capacity from 8 to 29,000 gallons.

Each of Quaker's non-U.S. associated companies (in which it owns a 50% or less interest and has significant influence) owns or leases a plant and/or sales facilities in various locations, with the exception of Primex, Ltd.

Item 3. ***Legal Proceedings.***

The Company is a party to proceedings, cases, and requests for information from, and negotiations with, various claimants and Federal and state agencies relating to various matters, including environmental matters. For information concerning pending asbestos-related litigation against an inactive subsidiary, certain environmental non-capital remediation costs and other legal-related matters, reference is made to Note 26 of Notes to Consolidated Financial Statements, included in Item 8 of this Report, which is incorporated herein by this reference. The Company is a party to other litigation which management currently believes will not have a material adverse effect on the Company's results of operations, cash flow or financial condition.

Item 4. ***Mine Safety Disclosures.***

Not Applicable.

Item 4(a). ***Information about our Executive Officers.***

Set forth below is information regarding the executive officers of the Company, each of whom have been employed by the Company or by Houghton for at least five years, including the respective positions and offices with the Company (or Houghton) held by each over the respective periods indicated. Each of the executive officers, with the exception of Mr. Hostetter, is appointed annually to a one-year term. Mr. Hostetter is considered an executive officer in his capacity as principal accounting officer for purposes of this Item.

Name, Age, and Present Position with the Company	**Business Experience During the Past Five Years and Period Served as an Officer**
Michael F. Barry, 62 Chairman of the Board, Chief Executive Officer, President and Director	Mr. Barry, who has been employed by the Company since 1998, has served as Chairman of the Board since May 2009, in addition to his position as Chief Executive Officer and President held since October 2008. He served as interim Chief Financial Officer from October through November 2015. He served as Senior Vice President and Managing Director – North America from January 2006 to October 2008. He served as Senior Vice President and Global Industry Leader – Metalworking and Coatings from July through December 2005. He served as Vice President and Global Industry Leader – Industrial Metalworking and Coatings from January 2004 through June 2005 and Vice President and Chief Financial Officer from 1998 to August 2004.
Joseph A. Berquist, 49 Senior Vice President, Global Specialty Businesses and Chief Strategy Officer	Mr. Berquist, who has been employed by the Company since 1997, has served as Senior Vice President, Global Specialty Businesses and Chief Strategy Officer since August 2019. He served as Vice President and Managing Director – North America from April 2010 until July 2019.
Jeewat Bijlani, 44 Senior Vice President, Managing Director - Americas	Mr. Bijlani has served as Senior Vice President, Managing Director - Americas since he joined the Company in August 2019. Prior to joining the Company, Mr. Bijlani served as President, Americas and Global Strategic Businesses of Houghton from March 2015 until July 2019. Prior to that role, he served as Senior Vice President M&A, Business Development and Strategic Planning to execute Houghton's growth initiatives with key customers and in business segments from December 2011 to March 2015. Prior to joining Houghton, Mr. Bijlani served as a Director in the Private Equity Group at Celerant Consulting from March 2006 to November 2011 where he led strategic and business transformation engagements in the Chemicals and Manufacturing sector.
Mary Dean Hall, 63 Senior Vice President, Chief Financial Officer and Treasurer	Ms. Hall, who has been employed by the Company since November 2015, has served as Senior Vice President, Chief Financial Officer and Treasurer since August 2019. She served as Vice President, Chief Financial Officer and Treasurer from November 2015 until July 2019. Prior to joining the Company, Ms. Hall served as the Vice President and Treasurer of Eastman Chemical Company from April 2009 until October 2015. Prior to that role, she held various senior-level financial positions of increasing responsibility with Eastman from 1995 through 2009, including Treasurer, Vice President and Controller, and Vice President, Finance.
Shane W. Hostetter, 39 Vice President, Finance and Chief Accounting Officer	Mr. Hostetter, who has been employed by the Company since July 2011, has served as Vice President, Finance and Chief Accounting Officer since August 2019. He served as Global Controller and Principal Accounting Officer from September 2014 until July 2019.
Kym Johnson, 50 Senior Vice President, Chief Human Resources Officer	Ms. Johnson has served as Senior Vice President, Chief Human Resources Officer since she joined the Company in August 2019. Prior to joining the Company, Ms. Johnson served as Senior Vice President Global Human Resources of Houghton from June 2015 until July 2019. Prior to joining Houghton, she served as Vice President, Human Resources and Chief Human Resources Officer of FMC Corporation from July 2013 to October 2014. Prior to that role, she held various senior-level human resources roles with FMC from July 1992 to October 2014, including Director, Global Talent Management and HR Director, Asia Pacific.

Name, Age, and Present Position with the Company	**Business Experience During the Past Five Years and Period Served as an Officer**
Dieter Laininger, 57 Senior Vice President, Managing Director - Asia / Pacific	Mr. Laininger, who has been employed by the Company since 1991, has served as Senior Vice Present, Managing Director – Asia / Pacific since August 2019. He served as Vice President and Managing Director – Asia / Pacific from April 2018 until July 2019, in addition to his role as Vice President and Managing Director - South America, a position he assumed in January 2013 and held until July 2019. Mr. Laininger also served as Vice President and Global Leader – Primary Metals, a position which he assumed in June 2011 and held until July 2019.
Wilbert Platzer, 59 Senior Vice President, Global Operations, Environmental Health & Safety (“EHS”) and Procurement	Mr. Platzer, who has been employed by the Company since 1995, has served as Senior Vice President, Global Operations, EHS and Procurement since August 2019. He served as Vice President, Global Operations, EHS and Procurement from April 2018 until July 2019. He served as Vice President and Managing Director – EMEA from January 2006 through March 2018.
Dr. David Slinkman, 56 Senior Vice President, Chief Technology Officer	Dr. Slinkman has served as Senior Vice President, Chief Technology Officer since he joined the Company in August 2019. Prior to joining the Company, Dr. Slinkman served as Vice President of Technology of Houghton from March 2012 until July 2019. Prior to joining Houghton, Dr. Slinkman served as Global Technology Leader of Nalco Chemical Company from 2008 until 2012. Prior to that role, he held various positions with Nalco from December 1990 until 2008 including Manager, Research and Development for the finishing technologies group, which encompassed both metal working fluids and surface treatment products, and Technical Director for the paper chemicals group.
Adrian Steeples, 60 Senior Vice President, Managing Director – EMEA	Mr. Steeples, who has been employed by the Company since 2010, has served as Senior Vice President, Managing Director – EMEA since August 2019. He served as Vice President and Managing Director – EMEA from April 2018 until July 2019. He served as Vice President and Managing Director - Asia/Pacific from July 2013 through March 2018.
Robert T. Traub, 56 Senior Vice President, General Counsel and Corporate Secretary	Mr. Traub, who has been employed by the Company since 2000, has served as Senior Vice President, General Counsel and Corporate Secretary since August 2019. He served as Vice President, General Counsel and Corporate Secretary from April 2015 until July 2019. He served as the Corporation’s General Counsel from March 2012 through March 2015. He has also served as Director of Global Corporate Compliance since January 2009.

PART II

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

The Company's common stock is listed on the New York Stock Exchange ("NYSE") under the trading symbol KWR. Our Board declared cash dividends that totaled $1.56 per share of outstanding common stock or $27.8 million during the year ended December 31, 2020 and $1.525 per share of outstanding common stock or $23.7 million during the year ended December 31, 2019. In February and May 2020, our Board declared quarterly cash dividends of $0.385 per share of outstanding common stock, payable to shareholders of record in April 2020 and July 2020, respectively. Subsequently, our Board declared quarterly dividends of $0.395 per share of outstanding common stock in September and November 2020, respectively, payable to shareholders of record in October 2020 and January 2021, respectively. We currently expect to continue to pay comparable cash dividends on a quarterly basis in the future. Future declaration of dividends and the establishment of future record dates and payment dates are subject to the final determination of our Board, and will be based on our future financial condition, results of operations, capital requirements, capital expenditure requirements, contractual restrictions, anticipated cash needs, business prospects, provisions of applicable law and other factors our Board may deem relevant.

There are no restrictions that the Company believes are likely to materially limit the payment of future dividends. However, under the Credit Facility there are certain restrictions, including a limit on dividends paid not to exceed the greater of $50.0 million annually and 20% of consolidated EBITDA so long as there is no default under the Credit Facility. Reference is made to the "Liquidity and Capital Resources" disclosure contained in Item 7 of this Report.

As of January 15, 2021, 17,853,463 shares of Quaker common stock were issued and outstanding and were held by 712 shareholders of record. Each share of common stock is entitled to one vote per share.

Reference is made to the information in Item 12 of this Report under the caption "Equity Compensation Plans," which is incorporated herein by this reference.

The following table sets forth information concerning shares of the Company's common stock acquired by the Company during the fourth quarter of 2020 for the period covered by this report:

Issuer Purchases of Equity Securities

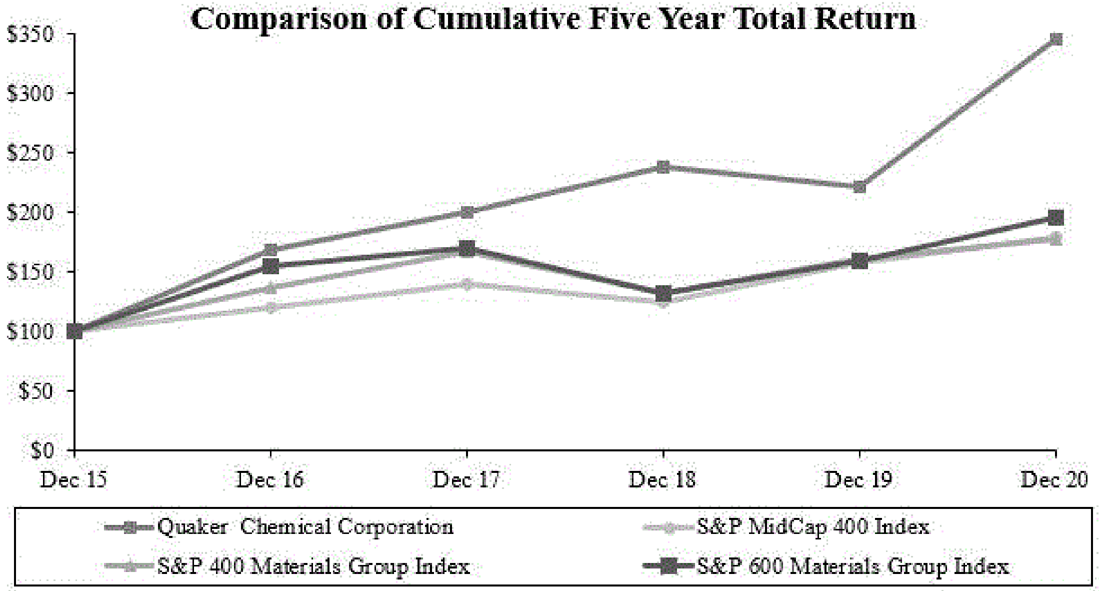
Period	(a) Total Number of Shares Purchased (1)	(b) Average Price Paid Per Share (2)	(c) Total Number of Shares Purchased as part of Publicly Announced Plans or Programs	(d) Approximate Dollar Value of Shares that May Yet be Purchased Under the Plans or Programs (3)
October 1 - October 31, 2020	—	$ —	—	$ 86,865,026
November 1 - November 30, 2020	—	$ —	—	$ 86,865,026
December 1 - December 31, 2020	—	$ —	—	$ 86,865,026
Total	—	$ —	—	$ 86,865,026

(1) The Company did not acquire any shares of the Company's common stock from employees during the fourth quarter of 2020. All shares that would be acquired from employees are related to the surrender of Quaker Chemical Corporation shares in payment of the exercise price of employee stock options exercised or for the payment of taxes upon exercise of employee stock options or the vesting of restricted stock.

(2) The Company did not acquire any shares of the Company's common stock from employees during the fourth quarter of 2020. The price that would be paid for shares acquired from employees pursuant to employee benefit and share-based compensation plans is based on the closing price of the Company's common stock on the date of exercise or vesting as specified by the plan pursuant to which the applicable option or restricted stock was granted.

(3) On May 6, 2015, the Board of Directors of the Company approved, and the Company announced, a share repurchase program, pursuant to which the Company is authorized to repurchase up to $100,000,000 of Quaker Chemical Corporation common stock (the "2015 Share Repurchase Program"). The 2015 Share Repurchase Program has no expiration date. There were no shares acquired by the Company pursuant to the 2015 Share Repurchase Program during the quarter ended December 31, 2020.

Stock Performance Graph: The following graph compares the cumulative total return (assuming reinvestment of dividends) from December 31, 2015 to December 31, 2020 for (i) Quaker's common stock, (ii) the S&P MidCap 400 Index (the "MidCap Index"), (iii) the S&P 400 Materials Group Index (the "Materials 400 Group Index") and (iv) the S&P 600 Materials Group Index (the "Materials 600 Group Index"). The graph assumes the investment of $100 on December 31, 2015 in each of Quaker's common stock, the stocks comprising the MidCap Index and the Materials Group Index, respectively. The comparison of the Materials 400 Group Index was added in 2020 to provide a closer comparison to the MidCap Index comparison.



	12/31/2015	12/31/2016	12/31/2017	12/31/2018	12/31/2019	12/31/2020
Quaker	$ 100.00	$ 168.15	$ 200.14	$ 237.98	$ 222.13	$ 345.21
MidCap Index	100.00	120.74	140.35	124.80	157.49	179.00
Materials 400 Group Index	100.00	137.25	166.82	132.84	160.57	177.66
Materials 600 Group Index	100.00	154.70	170.04	132.20	159.40	195.55

Item 6. *Selected Financial Data.*

The Company has omitted the table for selected financial data pursuant to the SEC Final Rule Release Nos. 33-10890, which among other revisions, amends certain disclosure requirements required by Regulation S-K relating to selected financial data (Item 301) and supplementary financial information (Item 302). The Company has early adopted the guidance on an Item-by-Item basis and eliminated Items 301 and 302 in its consolidated financial statements.

Item 7. *Management's Discussion and Analysis of Financial Condition and Results of Operations.*

As used in this Annual Report on Form 10-K (the "Report"), the terms "Quaker Houghton", the "Company", "we", and "our" refer to Quaker Chemical Corporation (doing business as Quaker Houghton), its subsidiaries, and associated companies, unless the context otherwise requires. The term Legacy Quaker refers to the Company prior to the closing of its combination with Houghton International, Inc. ("Houghton") (herein referred to as the "Combination") on August 1, 2019. Throughout the Report, all figures presented, unless otherwise stated, reflect the results of operations of the combined company for the year ended December 31, 2020, for the year ended December 31, 2019 includes the result of Legacy Quaker plus five months of Houghton's operations post-closing of the Combination on August 1, 2019, and for the year ended December 31, 2018, the results only of Legacy Quaker.

Executive Summary

Quaker Houghton is a global leader in industrial process fluids. With a presence around the world, including operations in over 25 countries, our customers include thousands of the world's most advanced and specialized steel, aluminum, automotive, aerospace, offshore, can, mining, and metalworking companies. Our high-performing, innovative and sustainable solutions are backed by best-in-class technology, deep process knowledge, and customized services. Quaker Houghton is headquartered in Conshohocken, Pennsylvania, located near Philadelphia in the U.S.

Overall, the Company's 2020 performance, like most other companies in the world, was negatively impacted by the COVID-19 pandemic and its impact on the global economy, including most of the Company's customers. However, the Company's acquisition activity in late 2019, including the Houghton Combination and the Norman Hay acquisition, drove a 25% increase in 2020 net sales to $1,417.7 million compared to $1,133.5 million in 2019. Excluding net sales from acquisitions, current year net sales would have declined approximately 11% primarily due to a 9% decrease in sales volumes associated with the negative impacts of COVID-19 on global production levels throughout each of the Company's segments. Similar to net sales, the Company's gross profit and selling, general and administrative expenses ("SG&A") also increased due to the full year inclusion of Houghton and Norman Hay, but both also benefited from the realization of cost savings associated with synergies achieved with the Combination as well as the impact of cost saving measures put in place to help offset the impacts of COVID-19. The Company's 2020 reported operating income of $59.4 million increased compared to $46.1 million in 2019. Excluding all one-time costs and other non-core items that largely related to the Combination and Norman Hay in each period, the Company's non-GAAP operating income of $134.0 million increased 10% compared to $122.0 million in 2019, primarily due to the net sales increases and cost synergies and savings mentioned above. Further details of the Company's consolidated operating performance are discussed in the Company's Consolidated Operations Review, in the Operations section of this Item, below.

The Company's net income and earnings per diluted share of $39.7 million and $2.22 in 2020, respectively, increased compared to $31.6 million and $2.08 per diluted share, respectively, in 2019. Excluding all one-time costs and other non-core items that largely related to the Combination and Norman Hay in each period, the Company's current year non-GAAP net income and non-GAAP earnings per diluted share were $85.2 million and $4.78, respectively, compared to $88.7 million and $5.83, respectively, in 2019. The increase in the Company's current year reported earnings drove a 28% higher adjusted EBITDA of $222.0 million compared to $173.1 million in 2019, primarily due to the Houghton and Norman Hay acquisitions as well as the benefit of costs savings associated with the Combination, partially offset by the negative impacts of COVID-19. See the Non-GAAP Measures section of this Item, below.

The Company's 2020 operating performance in each of its four reportable segments: (i) Americas; (ii) Europe, Middle East and Africa ("EMEA"); (iii) Asia/Pacific; and (iv) Global Specialty Businesses, reflect similar drivers to that of its consolidated performance. Each segment's net sales benefited from a full year of Houghton and the Company's Global Specialty Businesses segment also benefited from a full year of Norman Hay. Without the inclusion of Houghton and Norman Hay, net sales would have been lower in all segments compared to the prior year, primarily driven by declines in volume primarily due to the negative impacts of COVID-19 on the Company's end markets. As reported, all of the Company's segment operating earnings were higher compared to 2019 because of the inclusion of a full year of Houghton and Norman Hay as well as cost synergies achieved with the Combination and other cost savings actions taken due to COVID-19, partially offset by the negative impacts of COVID-19 on global sales volumes. Additional details of each segment's operating performance are further discussed in the Company's reportable segments review, in the Operations section of this Item, below.

The Company generated net operating cash flow of $178.4 million in 2020 compared to $82.4 million in 2019. The 117% increase in net operating cash flow year-over-year was primarily driven by the inclusion of a full year of earnings from Houghton and Norman Hay, as well as higher operating cash flow due to changes in working capital. The key drivers of the Company's operating cash flow and overall liquidity are further discussed in the Company's Liquidity and Capital Resources section of this Item, below.

Overall, the Company's 2020 results reflect the fact that the negative impacts of COVID-19 were partially offset by the positive impacts of a full year of Houghton and Norman Hay performance, Combination synergies and cost savings actions. The Company's performance showed a good quarterly growth trend across the globe beginning after the second quarter of 2020, during which the impacts of COVID-19 were most severe, indicating a gradual improvement in the Company's end markets and continued market share gains. Despite these challenges, the Company was able to generate significant net operating cash flow in 2020, continue to pay its regular dividends, pay down its debt above its required commitments, and continue to execute its integration plans for the Combination.

The global economic slowdown and other impacts due to COVID-19 posed an unprecedented challenge in 2020, but the Company successfully navigated this downturn, demonstrating its ability to respond quickly to changing market conditions and deliver on the benefits it anticipated from the Combination with Houghton. In 2020, the Company continued to service and supply its customers despite very difficult economic conditions, it continued to gain share in the market, it completed a significant part of the integration activities, and realized $58 million of cost synergies which exceeded the original estimate of $35 million. The Company also made recent bolt-on acquisitions which are expected to contribute towards earnings growth in 2021 and, even with those acquisitions, the Company reduced its net debt by 12% or $94 million during 2020. As the Company looks forward, it expects some short-term headwinds from higher raw material costs and lower than expected volumes in the automotive market due to the semiconductor shortage. However, the Company expects 2021 to result in a step change in its profitability from 2020 as the Company completes its integration cost synergies, continues to take further share in the marketplace, benefits from a projected gradual rebound in demand, and sees the positive impact of its recent acquisitions.

Impact of COVID-19

In early 2020, the global outbreak of COVID-19 negatively impacted all locations where the Company does business. Although the Company has now operated during several quarters in this COVID-19 environment, the full extent of the outbreak and related business impacts remains uncertain and volatile, and therefore the full extent to which COVID-19 may impact the Company's future results of operations or financial condition is uncertain. This outbreak has significantly disrupted the operations of the Company and those of its suppliers and customers. The Company has experienced significant volume declines and lower net sales as further described in this section, initially at its China subsidiaries in the first quarter of 2020 and, beginning in late March continued throughout the rest of its business due to the global economic slowdown brought on by COVID-19. Management continues to monitor the impact that the COVID-19 pandemic is having on the Company, the overall specialty chemical industry and the economies and markets in which the Company operates.

Given the speed and frequency of the continuously evolving developments with respect to this pandemic, the Company cannot, as of the date of this Report, reasonably estimate the magnitude or the full extent of the impact to its future results of operations or to the ability of it or its customers to resume more normal operations, even as certain restrictions are lifted. The prolonged pandemic and a resurgence of the outbreak, and continued restrictions on day-to-day life and business operations may result in volume declines and lower net sales in future periods as compared to pre-COVID-19 levels. To the extent that the Company's customers and suppliers continue to be significantly and adversely impacted by COVID-19, this could reduce the availability, or result in delays, of materials or supplies to or from the Company, which in turn could significantly interrupt the Company's business operations. Given this ongoing uncertainty, the Company cautions that its future results of operations could be significantly adversely impacted by COVID-19.

Further, management continues to evaluate how COVID-19-related circumstances, such as remote work arrangements, illness or staffing shortages and travel restrictions have affected financial reporting processes and systems, internal control over financial reporting, and disclosure controls and procedures. While the circumstances have presented and are expected to continue to present challenges, and have necessitated additional time and resources to be deployed to sufficiently address the challenges brought on by the pandemic, at this time, except as otherwise noted in Item 9A of this Report, management does not believe that COVID-19 has had a material impact on financial reporting processes, internal controls over financial reporting, or disclosure controls and procedures. For additional information regarding the potential impact of COVID-19, see Item 1A of Part I of this Report.

The Company's top priority is, and especially during this pandemic remains, to protect the health and safety of its employees and customers, while working to ensure business continuity to meet customers' needs:

- *Our People* – The Company has taken steps to protect the health and wellbeing of its people in affected areas through various actions, including enabling work at home where needed and possible, and employing social distancing standards, implementing travel restrictions where applicable, enhancing onsite hygiene practices, and instituting visitation restrictions at the Company's facilities. The Company does not expect that it will incur material expenses implementing health and safety policies for employees, contractors, and customers.

- *Our Operations* – Currently, all of the Company's 31 production facilities worldwide are open and operating and are deemed as essential businesses in the jurisdictions where they are operating. The Company believes that to date it has been able to meet the needs of all its customers across the globe despite the current economic challenges.

- *Our Business Conditions* – The Company's second half of 2020 showed solid improvement over the first half, which was consistent with expectations that April and May would be the worst months of the year and that the Company would show gradual quarterly improvement sequentially throughout the remainder of the year. However, demand still remained lower than pre-COVID-19 levels as many customers maintained reduced production levels through the end of 2020. Excluding Houghton and Norman Hay net sales, all four of the Company's reportable segments showed declines in net sales due to COVID-19 during 2020 compared to the prior year, with the Americas and EMEA being the most impacted and Asia/Pacific being the least impacted. The Company currently expects that the impact from COVID-19 will gradually improve each quarter in 2021 subject to the effective containment of the virus and successful distribution of a vaccine. However, the incidence of reported cases of COVID-19 appears to be again increasing in several geographies where we have significant operations and it remains highly uncertain as to how long the global pandemic and related economic challenges will last and when our customers' businesses will recover.

- *Our Actions* – The Company took various actions to temporarily conserve cash and reduce costs during 2020. Some of these actions during 2020 included eliminating all discretionary expenditures, delaying or freezing salary increases where legally permitted, reducing executives' salaries for a period of time, lowering 2020 planned capital expenditures by approximately 30%, and accelerating and fine-tuning the Company's integration plans. These temporary initiatives were designed and implemented so that the Company could successfully manage through the challenging COVID-19 situation while continuing to protect the health of its employees, meet customers' needs, maintain the Company's long-term competitive advantages and above-market growth, and enable it to continue to effectively integrate Houghton. While the actions taken in 2020 to protect our workforce, to continue to serve our customers with excellence and to conserve cash and reduce costs, have been effective thus far, further actions to respond to the pandemic and its effects may be necessary as conditions continue to evolve.

Critical Accounting Policies and Estimates

Quaker Houghton's discussion and analysis of its financial condition and results of operations are based upon its consolidated financial statements which have been prepared in accordance with accounting principles generally accepted in the United States ("U.S. GAAP"). The preparation of these financial statements requires the Company to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities. On an ongoing basis, the Company evaluates its estimates, including those related to customer sales incentives, product returns, bad debts, inventories, property, plant and equipment ("PP&E"), investments, goodwill, intangible assets, income taxes, business combinations, restructuring, incentive compensation plans (including equity-based compensation), pensions and other postretirement benefits, contingencies and litigation. Quaker Houghton bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under such 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. However, actual results may differ from these estimates under different assumptions or conditions.

Quaker Houghton believes the following critical accounting policies describe the more significant judgments and estimates used in the preparation of its consolidated financial statements:

Accounts receivable and inventory exposures: Quaker Houghton establishes allowances for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments. 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. As part of our terms of trade, we may custom manufacture products for certain large customers and/or may ship products on a consignment basis. Further, a significant portion of our revenue is derived from sales to customers in industries where companies have experienced past financial difficulties. If a significant customer bankruptcy occurs, then we must judge the amount of proceeds, if any, that may ultimately be received through the bankruptcy or liquidation process. These matters may increase the Company's exposure should a bankruptcy occur, and may require a write down or a disposal of certain inventory as well as the failure to collect receivables. Reserves for customers filing for bankruptcy protection are established based on a percentage of the amount of receivables outstanding at the bankruptcy filing date. However, initially establishing this reserve and the amount thereof is dependent on the Company's evaluation of likely proceeds to be received from the bankruptcy process, which could result in the Company recognizing minimal or no reserve at the date of bankruptcy. We generally reserve for large and/or financially distressed customers on a specific review basis, while a general reserve is maintained for other customers based on historical experience. The Company's consolidated allowance for doubtful accounts was $13.1 million and $11.7 million as of December 31, 2020 and 2019, respectively. The Company recorded expense to increase its provision for doubtful accounts by $3.6 million, $1.9 million and $0.5 million for the years ended December 31, 2020, 2019 and 2018, respectively. Changing the amount of expense recorded to the Company's provisions by 10% would have increased or decreased the Company's pre-tax earnings by $0.4 million, $0.2 million and $0.1 million for the years ended December 31, 2020, 2019 and 2018, respectively. See Note 13 of Notes to Consolidated Financial Statements in Item 8 of this Report.

Environmental and litigation reserves: Accruals for environmental and litigation matters are recorded when it is probable that a liability has been incurred and the amount of the liability can be reasonably estimated. Environmental costs and remediation costs are capitalized if the costs extend the life, increase the capacity or improve the safety or efficiency of the property from the date acquired or constructed, and/or mitigate or prevent contamination in the future. Estimates for accruals for environmental matters are based on a variety of potential technical solutions, governmental regulations and other factors, and are subject to a wide range of potential costs for remediation and other actions. A considerable amount of judgment is required in determining the most likely estimate within the range of total costs, and the factors determining this judgment may vary over time. Similarly, reserves for litigation and similar matters are based on a range of potential outcomes and require considerable judgment in determining the most probable outcome. If no amount within the range is considered more probable than any other amount, the Company accrues the lowest amount in that range in accordance with generally accepted accounting principles. See Note 26 of Notes to Consolidated Financial Statements in Item 8 of this Report.

Realizability of equity investments: The Company holds equity investments in various foreign companies where it has the ability to influence, but not control, the operations of the entity and its future results. The Company would record an impairment charge to an investment if it concluded that a decline in value that was other than temporary occurred. Adverse changes in market conditions, poor operating results of underlying investments, devaluation of foreign currencies or other events or circumstances could result in losses or an inability to recover the carrying value of the investments, potentially leading to an impairment charge in the future. The carrying amount of the Company's equity investments as of December 31, 2020 was $95.8 million, which included four investments: $19.4 million for a 32% interest in Primex, Ltd. (Barbados); $7.8 million for a 50% interest in Nippon Quaker Chemical, Ltd. (Japan); $0.3 million for a 50% interest in Kelko Quaker Chemical, S.A. (Panama); and $68.3 million for a 50% interest in Korea Houghton Corporation (Korea). The Company also has a 50% interest in a Venezuelan affiliate, Kelko Quaker Chemical, S.A (Venezuela). Due to heightened foreign exchange controls, deteriorating economic circumstances and other restrictions in Venezuela, during the third quarter of 2018 the Company concluded that it no longer had significant influence over this affiliate. Prior to this determination, the Company historically accounted for this affiliate under the equity method. As of December 31, 2020 and 2019, the Company had no remaining carrying value for its investment in Venezuela. See Note 17 of Notes to Consolidated Financial Statements in Item 8 of this Report.

Tax exposures, uncertain tax positions and valuation allowances: Quaker Houghton records expenses and liabilities for taxes based on estimates of amounts that will be determined as deductible in tax returns filed in various jurisdictions. The filed tax returns are subject to audit, which often occur several years subsequent to the date of the financial statements. Disputes or disagreements may arise during audits over the timing or validity of certain items or deductions, which may not be resolved for extended periods of time. The Company also evaluates uncertain tax positions on all income tax positions taken on previously filed tax returns or expected to be taken on a future tax return in accordance with FIN 48, which prescribes the recognition threshold and measurement attributes for financial statement recognition and measurement of tax positions taken or expected to be taken on a tax return and, also, whether the benefits of tax positions are probable or if they will be more likely than not to be sustained upon audit based upon the technical merits of the tax position. For tax positions that are determined to be more likely than not to be sustained upon audit, the Company recognizes the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement in the financial statements. For tax positions that are not determined to be more likely than not sustained upon audit, the Company does not recognize any portion of the benefit in its financial statements. In addition, the Company's continuing practice is to recognize interest and/or penalties related to income tax matters in income tax expense. Also, the Company nets its liability for unrecognized tax benefits against deferred tax assets related to net operating losses or other tax credit carryforward on the basis that the uncertain tax position is settled for the presumed amount at the balance sheet date.

Quaker Houghton also records valuation allowances when necessary to reduce its deferred tax assets to the amount that is more likely than not to be realized. While the Company has considered future taxable income and assesses the need for a valuation allowance, in the event Quaker Houghton were to determine that it would be able to realize its deferred tax assets in the future in excess of its net recorded amount, an adjustment to the deferred tax asset would increase income in the period such determination was made. Likewise, should the Company determine that it would not be able to realize all or part of its net deferred tax assets in the future, an adjustment to the deferred tax asset would be charged to income in the period such determination was made. Both determinations could have a material impact on the Company's financial statements.

In 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as "U.S. Tax Reform" which implemented significant changes, particularly impacting taxation for non-U.S. earnings and dividends from certain foreign subsidiaries. Based on interpretations and assumptions the Company believes to be reasonable with regard to various uncertainties and ambiguities in the application of certain provisions of U.S. Tax Reform and subsequent to numerous temporary regulations, notices, and other formal guidance published by the Internal Revenue Service ("I.R.S."), U.S. Treasury, and various state taxing authorities in 2018, the Company completed its accounting for the tax effects of U.S. Tax Reform as of December 22, 2018. It is possible that the I.R.S. could issue subsequent guidance or take positions on audit that differ from the Company's interpretations and assumptions. The Company currently believes that subsequent guidance or interpretations made by the I.R.S. will not be materially different from the Company's application of the provisions of U.S. Tax Reform and would not have a material adverse effect on the Company's tax liabilities, earnings, or financial condition.

Pursuant to U.S. Tax Reform, the Company recorded a $15.5 million transition tax liability for U.S. income taxes on the undistributed earnings of non-U.S. subsidiaries. As of December 31, 2020, $7.0 million in installment have been paid with the remaining $8.5 million to be paid through installments in future years. However, the Company may also be subject to other taxes, such as withholding taxes and dividend distribution taxes, if these undistributed earnings are ultimately remitted to the U.S. As of December 31, 2020, the Company has a deferred tax liability of $5.9 million, which primarily represents the estimate of the non-U.S. taxes the Company will incur to remit certain previously taxed earnings to the U.S. It is the Company's current intention to reinvest its future undistributed earnings of non-U.S. subsidiaries to support working capital needs and certain other growth initiatives outside of the U.S. The amount of such undistributed earnings at December 31, 2020 was approximately $322.6 million. Any tax liability which might result from ultimate remittance of these earnings is expected to be substantially offset by foreign tax credits (subject to certain limitations). It is currently impractical to estimate any such incremental tax expense. See Note 10 of Notes to Consolidated Financial Statements in Item 8 of this Report.

Goodwill and other intangible assets: The Company accounts for business combinations under the acquisition method of accounting. This method requires the recording of acquired assets, including separately identifiable intangible assets, at their acquisition date fair values. Any excess of the purchase price over the estimated fair value of the identifiable net assets acquired is recorded as goodwill. The determination of the estimated fair value of assets acquired requires management's judgment and often involves the use of significant estimates and assumptions, including assumptions with respect to future cash inflows and outflows, discount rates, royalty rates, asset lives and market multiples, among other items. When necessary, the Company consults with external advisors to help determine fair value. For non-observable market values, the Company may determine fair value using acceptable valuation principles, including the excess earnings, relief from royalty, lost profit or cost methods.

The Company amortizes definite-lived intangible assets on a straight-line basis over their useful lives. Goodwill and intangible assets that have indefinite lives are not amortized and are required to be assessed at least annually for impairment. The Company completes its annual goodwill and indefinite lived intangible asset impairment test during the fourth quarter of each year, or more frequently if triggering events indicate a possible impairment. In completing a quantitative impairment test, the Company compares the reporting units' or indefinite lived intangible assets fair value to their carrying value, primarily based on future discounted cash flows, in order to determine if an impairment charge is warranted. The estimates of future discounted cash flows involve considerable management judgment and are based upon certain significant assumptions. These assumptions include the weighted average cost of capital ("WACC") as well as projected revenue growth rates and operating income, which result in estimated EBITDA and EBITDA margins.

As of March 31, 2020, the Company evaluated the initial impact of COVID-19 on the Company's operations, as well as the volatility and uncertainty in the economic outlook as a result of COVID-19, to determine if this indicated it was more likely than not that the carrying value of any of the Company's indefinite-lived or long-lived assets was not recoverable. The Company considered the negative effect of COVID-19 on the Company's operations and, at the time, the impact it expected to have on its full year 2020 results in evaluating if a triggering event was present for one or more of the Company indefinite-lived or long-lived assets and, also, the Company took into consideration the carrying value and estimated fair value for each of its assets. The Company concluded that the impact of COVID-19 did not represent a triggering event as of March 31, 2020 with regards to any of the Company's indefinite-lived and long-lived assets, except for the Company's Houghton and Fluidcare trademarks and tradename indefinite-lived intangible assets.

Given the relatively short period of time between the fair value determination of the acquired Houghton and Fluidcare trademarks and tradename intangible assets as of the closing of the Combination on August 1, 2019, and the 2019 annual impairment testing date of October 1, the Company's 2019 annual impairment assessment concluded that the $242.0 million carrying value of acquired Houghton and Fluidcare trademarks and tradename intangible assets generally approximated fair value, with excess fair value of less than 5%. Because of the previously concluded relatively narrow gap between its fair value and its carrying value, the Company concluded in the first quarter of 2020 that the expected current year impact from COVID-19 on the Company's net sales represented a triggering event. As a result of the conclusion, the Company completed an interim quantitative indefinite-lived intangible asset impairment assessment as of March 31, 2020.

The determination of estimated fair value of the Houghton and Fluidcare trademarks and tradename intangible assets was based on a relief from royalty valuation method which requires management's judgment and often involves the use of significant estimates and assumptions, including assumptions with respect to the WACC and royalty rates, as well as revenue growth rates and terminal growth rates. In completing the interim quantitative impairment assessment as of March 31, 2020, the Company used a WACC assumption of approximately 10% as well as current year forecasted net sales and management's estimates with respect to future net sales growth rates specific to legacy Houghton's net sales. As a result of an increase in the WACC assumption as of March 31, 2020, compared to the prior year fourth quarter annual impairment assessment, and the significant decline in current year projected legacy Houghton net sales due to the impact of COVID-19, the Company concluded that the estimated fair values of these intangible assets were less than their carrying values and that an impairment charge to write down their carrying values to their estimated fair values was warranted. This resulted in a first quarter of 2020 non-cash impairment charge of $38.0 million for these indefinite-lived intangible assets, primarily related to the Houghton trademarks and tradename. The book value of these assets as of December 31, 2020 was $204.0 million.

The Company's consolidated goodwill at December 31, 2020 and 2019 was $631.2 million and $607.2 million, respectively. The Company completed its annual impairment assessment over goodwill during the fourth quarter of 2020, and no impairment charges were warranted. Furthermore, the estimated fair value of each of the Company's reporting units substantially exceeded their carrying value, with none of the Company's reporting units at risk for failing the goodwill impairment test. The Company used a WACC assumption for each of its reporting units of approximately 9.5%, and this assumption would have had to increase by approximately 59%, or 6 percentage points, before any of the Company's reporting units would be considered potentially impaired. Separately, the Company's assumption of future and projected EBITDA margins by reporting unit would have had to decrease by more than approximately 75% before any of the Company's reporting units would be considered potentially impaired. The Company's consolidated indefinite-lived intangible assets at December 31, 2020 and 2019 were $205.1 million and $243.1 million, respectively. The Company completed its annual indefinite lived intangible asset impairment assessment during the fourth quarter of 2020, and determined that no impairment charge was warranted. The Company's impairment assessment concluded that the $204.0 million carrying value of acquired Houghton and Fluidcare trademarks and tradename intangible assets exceeded fair value by approximately 18%. See Note 16 of Notes to Consolidated Financial Statements in Item 8 of this Report.

Pension and Postretirement benefits: The Company provides certain defined benefit pension and other postretirement benefits to current employees, former employees and retirees. Independent actuaries, in accordance with U.S. GAAP, perform the required valuations to determine benefit expense and, if necessary, non-cash charges to equity for additional minimum pension liabilities. Critical assumptions used in the actuarial valuation include the weighted average discount rate, which is based on applicable yield curve data, including the use of a split discount rate (spot-rate approach) for the U.S. plans and certain foreign plans, rates of increase in compensation levels, and expected long-term rates of return on assets. If different assumptions were used, additional pension expense or charges to equity might be required.

The Company had two noncontributory U.S. pension plans, one of which (the "Legacy Quaker U.S. Pension Plan") had a November 30 year-end and a measurement date of December 31. As previously disclosed, the Company began the process of terminating the Legacy Quaker U.S. Pension Plan during the fourth quarter of 2018. During the third quarter of 2019, the Company received a favorable termination determination letter from the Internal Revenue Service ("I.R.S.") and completed the Legacy Quaker U.S. Pension Plan termination during the first quarter of 2020. In order to terminate the Legacy Quaker U.S. Pension Plan in accordance with I.R.S. and Pension Benefit Guaranty Corporation requirements, the Company was required to fully fund the Legacy Quaker U.S. Pension Plan on a termination basis and the amount necessary to do so was approximately $1.8 million, subject to final true up adjustments. In the third quarter of 2020, the Company finalized the amount of the liability and related annuity payments and received a refund in premium of approximately $1.6 million. In addition, the Company recorded a non-cash pension settlement charge at plan termination of approximately $22.7 million. This settlement charge included the immediate recognition into expense of the related unrecognized losses within accumulated other comprehensive income (loss) ("AOCI") on the balance sheet as of the plan termination date.

The following table highlights the potential impact on the Company's pre-tax earnings due to changes in assumptions with respect to the Company's defined benefit pension and postretirement benefit plans, based on assets and liabilities as of December 31, 2020:

	1/2 Percentage Point Increase			1/2 Percentage Point Decrease		
(dollars in millions)	**Foreign**	**U.S.**	**Total**	**Foreign**	**U.S.**	**Total**
Discount rate (1)	$ 0.4	$ 0.2	$ 0.6	$ (0.4)	$ (0.2)	$ (0.6)
Expected rate of return on plan assets (2)	0.9	0.2	1.1	(1.0)	(0.2)	(1.2)

(1) The weighted-average discount rate used to determine net periodic benefit costs for the year ended December 31, 2020 was 2.3% for Foreign plans and 3.1% for U.S. plans.

(2) The weighted average expected rate of return on plan assets used to determine net periodic benefit costs for the year ended December 31, 2020 was 2.2% for Foreign plans and 6.5% for U.S. plans.

Restructuring and other related liabilities: A restructuring related program may consist of charges for employee severance, rationalization of manufacturing facilities and other related expenses. To account for such, the Company applies the Financial Accounting Standards Board's guidance regarding exit or disposal cost obligations. This guidance requires that a liability for a cost associated with an exit or disposal activity be recognized when the liability is incurred, is estimable, and payment is probable. See Note 7 of Notes to Consolidated Financial Statements in Item 8 of this Report.

Recently Issued Accounting Standards

See Note 3 of Notes to the Consolidated Financial Statements in Item 8 of this Report for a discussion regarding recently issued accounting standards.

Liquidity and Capital Resources

At December 31, 2020, the Company had cash, cash equivalents and restricted cash of $181.9 million. Total cash, cash equivalents and restricted cash was $143.6 million at December 31, 2019. The $38.3 million increase in cash, cash equivalents and restricted cash was the net result of $178.4 million of cash provided by operating activities and $6.6 million of positive impacts due to the effect of foreign currency translation on cash, partially offset by $75.3 million of cash used in financing activities and $71.4 million of cash used in investing activities.

Net cash flows provided by operating activities were $178.4 million in 2020 compared to $82.4 million in 2019. The Company's current year net operating cash flow increase was largely due to higher earnings from including a full year of Houghton and Norman Hay, lower net cash outflows than in 2019 associated with restructuring and the Combination and other acquisition-related expenses, higher cash dividends received from its equity affiliated companies year-over-year, and higher operating cashflow from changes in working capital. The operating cashflow improvement due to working capital changes includes benefits from changes in accounts payable and accrued liabilities due to more favorable negotiated vendor terms and other benefits from the Combination, impacts due to volume declines related to COVID-19, and lower cash tax payments due to current year mix of earnings and deductibility of one-time expenses.

Net cash flows used in investing activities were $71.4 million in 2020 compared to $908.6 million in 2019. This $837.2 million decrease in cash outflows used in investing activities was largely due to a decrease in payments related to acquisitions as the prior year $893.4 million outflow included the closing of the Combination on August 1, 2019, as further described below, compared to the current year payments related to acquisitions of $56.2 million that were mainly driven by the acquisition of Coral for approximately $53.1 million, net of cash acquired, further described below, and a post-closing adjustment related to Norman Hay of approximately $3.2 million. In addition, the Company had higher investments in property, plant and equipment in the current year due to the inclusion of a full year of both Houghton and Norman Hay, including higher expenditures related to integrating the companies during 2020. These higher outflows were partially offset by approximately $2.6 million of higher proceeds from disposition of assets in 2020, which was mainly driven by the sale of certain assets as part of its Combination integration plan.

Net cash flows used in financing activities were $75.3 million in 2020 compared to cash provided in financing activities of $844.1 million in 2019. The $919.4 million decrease in net cash flows from financing activities was due primarily to $897.1 million of additional term loan and revolving credit facility borrowings in the prior year used to close the Combination compared to $49.1 million of current year debt repayments in accordance with its term loan agreements and other reductions in borrowings under its revolving credit facilities. Also, as part of the Combination, the Company incurred and paid debt issuance costs of approximately $23.7 million in the prior year. In addition, the Company paid $27.6 million of cash dividends during 2020, a $5.7 million or 26% increase in cash dividends compared to the prior year, primarily due to the approximately 4.3 million shares issued at closing of the Combination, as well as both the current year and prior year cash dividend per share increases. Finally, during 2020, the Company used $1.0 million to purchase the remaining noncontrolling interest in one of its South African affiliates. Prior to this buyout, this South African affiliate made a distribution to the prior noncontrolling affiliate shareholder of approximately $0.8 million in 2020. There were no similar noncontrolling interest activities in 2019.

On August 1, 2019, the Company completed the Combination, whereby the Company acquired all of the issued and outstanding shares of Houghton from Gulf Houghton Lubricants, Ltd. in accordance with the Share Purchase Agreement dated April 4, 2017. The final purchase consideration was comprised of: (i) $170.8 million in cash; (ii) the issuance of approximately 4.3 million shares of common stock of the Company with par value of $1.00, comprising 24.5% of the common stock of the Company at closing; and (iii) the Company's refinancing of $702.6 million of Houghton's indebtedness at closing. Cash acquired in the Combination was $75.8 million. Prior to the Combination, the Company secured commitments from certain banks for a new credit facility (as amended, the "Credit Facility").

The Credit Facility is comprised of a $400.0 million multicurrency revolver (the "Revolver"), a $600.0 million term loan (the "U.S. Term Loan"), each with the Company as borrower, and a $150.0 million (as of August 1, 2019) Euro equivalent term loan (the "Euro Term Loan" and together with the "U.S. Term Loan", the "Term Loans") with Quaker Chemical B.V., a Dutch subsidiary of the Company as borrower, each with a five-year term maturing in August 2024. Subject to the consent of the administrative agent and certain other conditions, the Company may designate additional borrowers. The maximum amount available under the Credit Facility can be increased by up to $300.0 million at the Company's request if there are lenders who agree to accept additional commitments and the Company has satisfied certain other conditions. Borrowings under the Credit Facility bear interest at a base rate or LIBOR plus an applicable margin based upon the Company's consolidated net leverage ratio. There are LIBOR replacement provisions that contemplate a further amendment if and when LIBOR ceases to be reported. The interest rate incurred on the outstanding borrowings under the Credit Facility during 2020 was approximately 2.1%. At December 31, 2020, the interest rate on the outstanding borrowings under the Credit Facility was approximately 1.9%. In addition to paying interest on outstanding principal under the Credit Facility, the Company is required to pay a commitment fee ranging from 0.2% to 0.3% depending on the Company's consolidated net leverage ratio to the lenders under the Revolver in respect of the unutilized commitments thereunder.

The Credit Facility is subject to certain financial and other covenants. The Company's initial consolidated net debt to consolidated adjusted EBITDA ratio could not exceed 4.25 to 1, with step downs in the permitted ratio over the term of the Credit Facility. As of December 31, 2020, the consolidated net debt to consolidated adjusted EBITDA ratio may not exceed 4.00 to 1. The Company's consolidated adjusted EBITDA to interest expense ratio may not be less than 3.0 to 1 over the term of the agreement. The Credit Facility also prohibits the payment of cash dividend if the Company is in default or if the amount of the dividend paid annually exceeds the greater of $50.0 million and 20% of consolidated adjusted EBITDA unless the ratio of consolidated net debt to consolidated adjusted EBITDA is less than 2.0 to 1, in which case there is no such limitation on amount. As of December 31, 2020 and December 31, 2019, the Company was in compliance with all of the Credit Facility covenants. The Term Loans have quarterly principal amortization during their five-year terms, with 5.0% amortization of the principal balance due in years 1 and 2, 7.5% in year 3, and 10.0% in years 4 and 5, with the remaining principal amount due at maturity. The Credit Facility is guaranteed by certain of the Company's domestic subsidiaries and is secured by first priority liens on substantially all of the assets of the Company and the domestic subsidiary guarantors, subject to certain customary exclusions. The obligations of the Dutch borrower are guaranteed only by certain foreign subsidiaries on an unsecured basis.

The Credit Facility required the Company to fix its variable interest rates on at least 20% of its total Term Loans. In order to satisfy this requirement as well as to manage the Company's exposure to variable interest rate risk associated with the Credit Facility, in November 2019, the Company entered into $170.0 million notional amounts of three-year interest rate swaps at a base rate of 1.64% plus an applicable margin as provided in the Credit Facility, based on the Company's consolidated net leverage ratio. At the time the Company entered into the swaps, and as of December 31, 2020, the aggregate interest rate on the swaps, including the fixed base rate plus an applicable margin, was 3.1%.

The Company capitalized $23.7 million of certain third-party debt issuance costs in connection with executing the Credit Facility. Approximately $15.5 million of the capitalized costs were attributed to the Term Loans and recorded as a direct reduction of long-term debt on the Company's Consolidated Balance Sheet. Approximately $8.3 million of the capitalized costs were attributed to the Revolver and recorded within other assets on the Company's Consolidated Balance Sheet. These capitalized costs are being amortized into interest expense over the five-year term of the Credit Facility.

As of December 31, 2020, the Company had Credit Facility borrowings outstanding of $887.1 million. As of December 31, 2019, the Company had Credit Facility borrowings outstandin g of $922.4 million. The Company has unused capacity under the Revolver of approximately $234 million, net of bank letters of credit of approximately $6 million, as of December 31, 2020. The Company's other debt obligations are primarily industrial development bonds, bank lines of credit and municipality-related loans, which totaled $12.1 million and $12.6 million as of December 31, 2020 and 2019, respectively. Total unused capacity under these arrangements as of December 31, 2020 was approximately $40 million. The Company's total net debt as of December 31, 2020 was $717.3 million.

The Company estimates that it realized full year cost synergies in 2020 of approximately $58 million compared to $7 million in 2019. The Company continues to expect to realize Combination cost synergies of approximately $75 million in 2021 and $80 million in 2022.

The Company expects to continue to incur additional costs and make associated cash payments to integrate Quaker and Houghton and continue realizing the Combination's total anticipated cost synergies. The Company expects total cash payments, including those pursuant to the QH Program, described below, but excluding incremental capital expenditures related to the Combination, will be in the range of 1.3 times its total anticipated 2022 cost synergies of $80 million. A significant portion of these costs were already incurred in 2019 and 2020, but the Company expects to continue to incur such costs through 2021. The Company incurred $30.3 million of total Combination, integration and other acquisition-related expenses in 2020, including $0.8 million of accelerated depreciation, a $0.6 million loss on the sale of held-for-sale assets, and $0.8 million of other income related to an indemnification asset, described in the Non-GAAP Measures section of this Item below. The Company had aggregate net cash outflows of approximately $29.4 million related to the Combination, integration and other acquisition-related expenses during 2020. Comparatively, in 2019, the Company incurred $38.0 million of total Combination, integration and other acquisition-related expenses, including $2.1 million of ticking fees as well as $0.6 million of accelerated depreciation, and aggregate net cash outflows related to these costs were approximately $52.4 million.

Quaker Houghton's management approved, and the Company initiated, a global restructuring plan (the "QH Program") in the third quarter of 2019 as part of its planned cost synergies associated with the Combination and recorded $26.7 million in restructuring and related charges in 2019. The Company recognized an additional $5.5 million of restructuring and related charges in 2020 as a result of the QH Program. The QH Program includes restructuring and associated severance costs to reduce total headcount by approximately 350 people globally and plans for the closure of certain manufacturing and non-manufacturing facilities. In connection with the plans for closure of certain manufacturing and non-manufacturing facilities, the Company made a decision to make available for sale certain facilities during the second quarter of 2020. During the fourth quarter of 2020, certain of these facilities were sold and the Company recognized a loss on disposal of $0.6 million included within other expense, net on the Consolidated Statement of Income. Additionally, certain buildings and land with an aggregate book value of approximately $10.0 million have been reclassified to other current assets from property, plant and equipment as of December 31, 2020. The Company expects to receive amounts in excess of net book value for the properties held for sale. The exact timing and total costs associated with the QH Program will depend on a number of factors and is subject to change; however, the Company currently expects reduction in headcount and site closures will continue to occur into 2021 under the QH Program and estimates that the anticipated cost synergies realized under this program will approximate one-times restructuring costs incurred. The Company made cash payments related to the settlement of restructuring liabilities under the QH Program during 2020 of approximately $15.7 million compared to $8.9 million in 2019.

As described above, in the first quarter of 2020, the Company completed the termination of the Legacy Quaker U.S. Pension Plan and funded the plan on a termination basis with approximately $1.8 million, subject to final true up adjustments. In the third quarter of 2020, the Company finalized the amount of liability and related annuity payments and received a refund in premium of $1.6 million. In addition, the Company recorded a non-cash pension settlement charge at plan termination of approximately $22.7 million in the first quarter of 2020.

On December 22, 2020, the Company closed its acquisition of Coral Chemical Company ("Coral"), a privately held, U.S. based provider of metal finishing fluid solutions. The purchase price was $54.1 million, on a cash-free and debt-free basis, subject to routine and customary post-closing adjustments related to working capital and net indebtedness levels. The Company expects to finalize its post-closing adjustments for the Coral acquisition in the first quarter of 2021. Cash paid for Coral in the fourth quarter of 2020 was approximately $53.1 million, net of cash acquired. In February 2021, the Company acquired certain assets related to tin-plating solutions primarily for steel end markets for approximately $25 million.

As of December 31, 2020, the Company's gross liability for uncertain tax positions, including interest and penalties, was $28.9 million. The Company cannot determine a reliable estimate of the timing of cash flows by period related to its uncertain tax position liability. However, should the entire liability be paid, the amount of the payment may be reduced by up to $7.5 million as a result of offsetting benefits in other tax jurisdictions. During the fourth quarter of 2020, one of the Company's subsidiaries received a notice of inspection from a taxing authority in a country where certain of its subsidiaries operate, which related to a non-income (indirect) tax that may be applicable to certain products the subsidiary sells. To date, the Company has not received any assessment from the authority related to potential liabilities that may be due from the Company's subsidiary. Consequently there is substantial uncertainty with respect to the Company's ultimate liability with respect to this indirect tax. See Note 26 of Notes to Consolidated Financial Statements in Item 8 of this Report.

The Company believes that its existing cash, anticipated cash flows from operations and available additional liquidity will be sufficient to support its operating requirements and fund its business objectives for at least the next twelve months, including but not limited to, payments of dividends to shareholders, costs related to the Combination and integration, pension plan contributions, capital expenditures, other business opportunities (including potential acquisitions) and other potential contingencies. The Company's liquidity is affected by many factors, some based on normal operations of our business and others related to the impact of the pandemic on our business and on global economic conditions as well as industry uncertainties, which we cannot predict. We also cannot predict economic conditions and industry downturns or the timing, strength or duration of recoveries. We may seek, as we believe appropriate, additional debt or equity financing which would provide capital for corporate purposes, working capital funding, additional liquidity needs or to fund future growth opportunities, including possible acquisitions and investments. The timing and amount of potential capital requirements cannot be determined at this time and will depend on a number of factors, including the actual and projected demand for our products, specialty chemical industry conditions, competitive factors, and the condition of financial markets, among others.

The following table summarizes the Company's contractual obligations as of December 31, 2020, and the effect such obligations are expected to have on its liquidity and cash flows in future periods. Pension and postretirement plan contributions beyond 2021 are not determinable since the amount of any contribution is heavily dependent on the future economic environment and investment returns on pension trust assets. The timing of payments related to other long-term liabilities which consists primarily of deferred compensation agreements and environmental reserves, also cannot be readily determined due to their uncertainty. Interest obligations on the Company's long-term debt and capital leases assume the current debt levels will be outstanding for the entire respective period and apply the interest rates in effect as of December 31, 2020.

	Payments due by period						
(dollars in thousands)							**2026 and**
Contractual Obligations	**Total**	**2021**	**2022**	**2023**	**2024**	**2025**	**Beyond**
Long-term debt	$ 898,789	$ 38,686	$ 57,754	$ 76,856	$ 715,155	$ 172	$ 10,166
Interest obligations	52,997	14,514	13,703	12,583	10,444	526	1,227
Capital lease obligations	439	109	96	87	72	59	16
Operating leases	43,544	12,342	8,395	6,220	4,610	3,836	8,141
Purchase obligations	2,377	2,279	92	6	-	-	-
Transition tax	8,500	-	-	1,529	3,099	3,872	-
Pension and other postretirement plan contributions	10,280	10,280	-	-	-	-	-
Other long-term liabilities (See Note 22 of Notes to Consolidated Financial Statements)	12,494	-	-	-	-	-	12,494
Total contractual cash obligations	$ 1,029,420	$ 78,210	$ 80,040	$ 97,281	$ 733,380	$ 8,465	$ 32,044

Non-GAAP Measures

The information in this Form 10-K filing includes non-GAAP (unaudited) financial information that includes EBITDA, adjusted EBITDA, adjusted EBITDA margin, non-GAAP operating income, non-GAAP operating margin, non-GAAP net income and non-GAAP earnings per diluted share. The Company believes these non-GAAP financial measures provide meaningful supplemental information as they enhance a reader's understanding of the financial performance of the Company, are indicative of future operating performance of the Company, and facilitate a comparison among fiscal periods, as the non-GAAP financial measures exclude items that are not considered indicative of future operating performance or not considered core to the Company's operations. Non-GAAP results are presented for supplemental informational purposes only and should not be considered a substitute for the financial information presented in accordance with GAAP.

The Company presents EBITDA which is calculated as net income attributable to the Company before depreciation and amortization, interest expense, net, and taxes on income before equity in net income of associated companies. The Company also presents adjusted EBITDA which is calculated as EBITDA plus or minus certain items that are not considered indicative of future operating performance or not considered core to the Company's operations. In addition, the Company presents non-GAAP operating income which is calculated as operating income plus or minus certain items that are not considered indicative of future operating performance or not considered core to the Company's operations. Adjusted EBITDA margin and non-GAAP operating margin are calculated as the percentage of adjusted EBITDA and non-GAAP operating income to consolidated net sales, respectively. The Company believes these non-GAAP measures provide transparent and useful information and are widely used by analysts, investors, and competitors in our industry as well as by management in assessing the operating performance of the Company on a consistent basis.

Additionally, the Company presents non-GAAP net income and non-GAAP earnings per diluted share as additional performance measures. Non-GAAP net income is calculated as adjusted EBITDA, defined above, less depreciation and amortization, interest expense, net, and taxes on income before equity in net income of associated companies, in each case adjusted, as applicable, for any depreciation, amortization, interest or tax impacts resulting from the non-core items identified in the reconciliation of net income attributable to the Company to adjusted EBITDA. Non-GAAP earnings per diluted share is calculated as non-GAAP net income per diluted share as accounted for under the "two-class share method." The Company believes that non-GAAP net income and non-GAAP earnings per diluted share provide transparent and useful information and are widely used by analysts, investors, and competitors in our industry as well as by management in assessing the operating performance of the Company on a consistent basis.

The following tables reconcile the Company's non-GAAP financial measures (unaudited) to their most directly comparable GAAP financial measures (dollars in thousands, unless otherwise noted, except per share amounts):

Non-GAAP Operating Income and Margin Reconciliations	**For the years ended December 31,**		
	2020	**2019**	**2018**
Operating income	$ 59,360	$ 46,134	$ 87,781
Fair value step up of inventory sold (a)	226	11,714	—
Houghton combination, integration and other acquisition-related expenses (b)	30,446	35,945	16,661
Restructuring and related charges (c)	5,541	26,678	—
Customer bankruptcy costs (d)	463	1,073	—
Charges related to the settlement of a non-core equipment sale (e)	—	384	—
Indefinite-lived intangible asset impairment (f)	38,000	—	—
Non-GAAP operating income	$ 134,036	$ 121,928	$ 104,442
Non-GAAP operating margin (%) (o)	9.5%	10.8%	12.0%

EBITDA, Adjusted EBITDA, Adjusted EBITDA Margin and Non-GAAP Net Income Reconciliations	**For the years ended December 31,**		
	2020	**2019**	**2018**
Net income attributable to Quaker Chemical Corporation	$ 39,658	$ 31,622	$ 59,473
Depreciation and amortization (b)(m)	84,494	45,264	19,714
Interest expense, net (b)	26,603	16,976	4,041
Taxes on income before equity in net income of associated companies (n)	(5,296)	2,084	25,050
EBITDA	145,459	95,946	108,278
Equity income in a captive insurance company (g)	(1,151)	(1,822)	(966)
Fair value step up of inventory sold (a)	226	11,714	—
Houghton combination, integration and other acquisition-related expenses (b)	29,538	35,361	16,051
Restructuring and related charges (c)	5,541	26,678	—
Customer bankruptcy costs (d)	463	1,073	—
Charges related to the settlement of a non-core equipment sale (e)	—	384	—
Indefinite-lived intangible asset impairment (f)	38,000	—	—
Pension and postretirement benefit costs, non-service components (h)	21,592	2,805	2,285
Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery (i)	(18,144)	(60)	(90)
Gain on liquidation of an inactive legal entity (j)	—	—	(446)
Currency conversion impacts of hyper-inflationary economies (k)	450	1,033	664
Adjusted EBITDA	$ 221,974	$ 173,112	$ 125,776
Adjusted EBITDA margin (%) (o)	15.7%	15.3%	14.5%
Adjusted EBITDA	$ 221,974	$ 173,112	$ 125,776
Less: Depreciation and amortization - adjusted (b)	83,732	44,680	19,714
Less: Interest expense, net - adjusted (b)	26,603	14,896	593
Less: Taxes on income before equity in net income of associated companies - adjusted (l)(n)	26,488	24,825	22,978
Non-GAAP net income	$ 85,151	$ 88,711	$ 82,491

Non-GAAP Earnings per Diluted Share Reconciliations	**For the years ending December 31,**		
	2020	**2019**	**2018**
GAAP earnings per diluted share attributable to			
Quaker Chemical Corporation common shareholders	$ 2.22	$ 2.08	$ 4.45
Equity income in a captive insurance company per diluted share (g)	(0.07)	(0.12)	(0.07)
Fair value step up of inventory sold per diluted share (a)	0.01	0.58	—
Houghton combination, integration and other			
acquisition-related expenses per diluted share (b)	1.31	2.05	1.21
Restructuring and related charges per diluted share (c)	0.23	1.34	—
Customer bankruptcy costs per diluted share (d)	0.02	0.05	—
Charges related to the settlement of a non-core equipment			
sale per diluted share (e)	—	0.02	—
Indefinite-lived intangible asset impairment per diluted share (f)	1.65	—	—
Pension and postretirement benefit costs, non-service			
components per diluted share (h)	0.79	0.14	0.13
Gain on changes in insurance settlement restrictions of an inactive			
subsidiary and related insurance insolvency recovery per diluted share (i)	(0.78)	(0.00)	(0.01)
Gain on liquidation of an inactive legal entity per diluted share (j)	—	—	(0.03)
Currency conversion impacts of hyper-inflationary economies			
per diluted share (k)	0.02	0.07	0.06
Impact of certain discrete tax items per diluted share (l)	(0.62)	(0.38)	0.43
Non-GAAP earnings per diluted share (p)	$ 4.78	$ 5.83	$ 6.17

(a) Fair value step up of inventory sold relates to expenses associated with selling inventory from acquired businesses which was adjusted to fair value as part of purchase accounting. These increases to costs of goods sold (“COGS”) are not indicative of the future operating performance of the Company.

(b) Houghton combination, integration and other acquisition-related expenses include certain legal, financial, and other advisory and consultant costs incurred in connection with due diligence, regulatory approvals and closing the Combination, as well as integration planning and post-closing integration activities including internal control readiness and remediation. These cost also include certain one-time labor costs associated with the Company’s acquisition-related activities. These costs are not indicative of the future operating performance of the Company. Approximately $1.5 million, $9.4 million and $5.1 million for the years ended December 31, 2020, 2019 and 2018, respectively, of these pre-tax costs were considered non-deductible for the purpose of determining the Company’s effective tax rate, and, therefore, taxes on income before equity in net income of associated companies - adjusted reflects the impact of these items. During 2020 and 2019, the Company recorded $0.8 million and $0.6 million, respectively, of accelerated depreciation related to certain of the Company’s facilities, which is included in the caption “Houghton combination, integration and other acquisition-related expenses” in the reconciliation of operating income to non-GAAP operating income and included in the caption “Depreciation and amortization” in the reconciliation of net income attributable to the Company to EBITDA, but excluded from the caption “Depreciation and amortization – adjusted” in the reconciliation of adjusted EBITDA to non-GAAP net income attributable to the Company. During 2019 and 2018, the Company incurred $2.1 million and $3.5 million, respectively, of ticking fees to maintain the bank commitment related to the Combination. These interest costs are included in the caption “Interest expense, net” in the reconciliation of net income attributable to the Company to EBITDA, but are excluded from the caption “Interest expense, net – adjusted” in the reconciliation of adjusted EBITDA to non-GAAP net income. During 2020, the Company recorded $0.8 million of other income related to an indemnification asset. During 2020 and 2018, the Company recorded a loss of $0.6 million and a gain of $0.6 million, respectively, on the sale of held-for-sale assets related to the Combination. Each of these items are included in the caption “Houghton combination, integration and other acquisition expenses” in the reconciliation of GAAP earnings per diluted share attributable to Quaker Chemical Corporation common shareholders to Non-GAAP earnings per diluted share as well as the reconciliation of Net Income attributable to Quaker Chemical Corporation to Adjusted EBITDA and Non-GAAP net income See Note 2 and Note 9 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(c) Restructuring and related charges represent the costs incurred by the Company associated with the QH restructuring program which was initiated in the third quarter of 2019 as part of the Company’s plan to realize cost synergies associated with the Combination. These costs are not indicative of the future operating performance of the Company. See Note 7 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(d) Customer bankruptcy costs represent the cost associated with a specific reserve for trade accounts receivable related to a customer who filed for bankruptcy protection. These expenses are not indicative of the future operating performance of the Company. See Note 13 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(e) Charges related to the settlement of a non-core equipment sale represent the pre-tax charge related to a one-time, uncommon, customer settlement associated with a prior sale of non-core equipment. These charges are not indicative of the future operating performance of the Company.

(f) Indefinite-lived intangible asset impairment represents the non-cash charge taken to write down the value of certain indefinite-lived intangible assets associated with the Houghton Combination. The Company has no prior history of goodwill or intangible asset impairments and this charge is not indicative of the future operating performance of the Company. See Note 16 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(g) Equity income in a captive insurance company represents the after-tax income attributable to the Company's interest in Primex, Ltd. ("Primex"), a captive insurance company. The Company holds a 32% investment in and has significant influence over Primex, and therefore accounts for this investment under the equity method of accounting. The income attributable to Primex is not indicative of the future operating performance of the Company and is not considered core to the Company's operations.

(h) Pension and postretirement benefit costs, non-service components represent the pre-tax, non-service components of the Company's pension and postretirement net periodic benefit cost in each period. These costs are not indicative of the future operating performance of the Company. The year ended December 31, 2020 includes a $22.7 million settlement charge for the Company's termination of the Legacy Quaker U.S. Pension Plan. See Note 21 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(i) Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery represents income associated with the gain on the termination of restrictions on insurance settlement reserves and the cash receipts from an insolvent insurance carrier for previously submitted claims by an inactive subsidiary of the Company. This other income is not indicative of the future operating performance of the Company. See Notes 9 and 26 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(j) Gain on liquidation of an inactive legal entity represents the decrease in historical cumulative currency translation adjustments associated with an inactive legal entity which was closed. These cumulative currency translation adjustments were the result of remeasuring the legal entity's monetary assets and liabilities to the applicable published exchange rates and were a component of accumulated other comprehensive loss, which was included in total shareholder's equity on the Company's Consolidated Balance Sheet. As required under U.S. GAAP, when a legal entity is liquidated, any amount attributable to that legal entity and accumulated in the currency translation adjustment component of equity is required to be removed from equity and reported as part of the gain or loss on liquidation of the legal entity during the period in which the liquidation occurs. This non-deductible recognized gain is not indicative of the future operating performance of the Company. See Note 9 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(k) Currency conversion impacts of hyper-inflationary economies represents the foreign currency remeasurement impacts associated with the Company's affiliates whose local economies are designated as hyper-inflationary under U.S. GAAP. An entity which operates within an economy deemed to be hyper-inflationary under U.S. GAAP is required to remeasure its monetary assets and liabilities to the applicable published exchange rates and record the associated gains or losses resulting from the remeasurement directly to the Consolidated Statements of Income. Venezuela's economy has been considered hyper-inflationary under U.S. GAAP since 2010, while Argentina's economy has been considered hyper-inflationary beginning July 1, 2018. In addition, the Company acquired an Argentine Houghton subsidiary which also applies hyper-inflationary accounting. During 2020 and 2019, the Company incurred non-deductible, pre-tax charges related to the Company's Argentine affiliates. During 2018, the Company incurred non-deductible, pre-tax charges related to the Company's Legacy Quaker Argentine affiliate as well as after-tax charges related to the Company's Venezuela joint venture. The charges incurred related to the immediate recognition of foreign currency remeasurement in the Consolidated Statements of Income associated with these entities are not indicative of the future operating performance of the Company. See Notes 1, 9 and 17 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(l) The impacts of certain discrete tax items included the impact of changes in the valuation allowance for foreign tax credits acquired with the Combination, changes in withholding tax rates and the associated impact on previously accrued for distributions at certain of the Company's Asia/Pacific subsidiaries, additional reserves for uncertain tax positions related to tax audits at certain of the Company's EMEA subsidiaries. This line item also includes deferred tax benefits the Company recorded in 2020 and 2019 related to intercompany intangible asset transfers and the related amortization of these deferred tax benefits. Additionally, the 2019 and 2018 amounts include certain transition tax adjustments related to adjustments to adopt U.S. Tax Reform. See Note 10 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(m) Depreciation and amortization for the years ended December 31, 2020 and 2019 includes $1.2 million and $0.4 million, respectively, of amortization expense recorded within equity in net income of associated companies in the Company's Consolidated Statements of Income, which is attributable to the amortization of the fair value step up for the Company's 50% interest in a Houghton joint venture in Korea as a result of required purchase accounting.

(n) Taxes on income before equity in net income of associated companies – adjusted presents the impact of any current and deferred income tax expense (benefit), as applicable, of the reconciling items presented in the reconciliation of net income attributable to Quaker Chemical Corporation to adjusted EBITDA, and was determined utilizing the applicable rates in the taxing jurisdictions in which these adjustments occurred, subject to deductibility. Fair value step up of inventory sold described in (a) resulted in incremental taxes of less than $0.1 million and $2.9 million for 2020 and 2019, respectively. Houghton combination, integration and other acquisition-related expenses described in (b) resulted in incremental taxes of $6.9 million for 2020, $6.7 million for 2019, and $3.1 million for 2018. Restructuring and related charges described in (c) resulted in incremental taxes of $1.4 million for 2020 and $6.2 million for 2019. Customer bankruptcy costs described in (d) resulted in incremental taxes of $0.1 million in 2020 and $0.3 million in 2019. Charges related to the settlement of a non-core equipment sale described in (e) resulted in incremental taxes of $0.1 million for 2019. Indefinite-lived intangible asset impairment described in (f) resulted in incremental taxes of $8.7 million for 2020. Pension and postretirement benefit costs, non-service components described in (h) resulted in incremental taxes of $7.5 million for 2020, $0.7 million for 2019, and $0.5 million for 2018. Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery described in (i) resulted in a reduction of taxes of $4.2 million in 2020 and less than $0.1 million in 2019 and 2018. Gain on liquidation of an inactive legal entity described in (k) resulted in a reduction of taxes of $0.1 million in 2018. The impact of certain discrete items described in (m) resulted in incremental taxes of $11.2 million for 2020, $5.7 million for 2019, and a reduction of taxes of $5.8 million in 2018.

(o) The Company calculates adjusted EBITDA margin and non-GAAP operating margin as the percentage of adjusted EBITDA and non-GAAP operating income to consolidated net sales.

(p) The Company calculates non-GAAP earnings per diluted share as non-GAAP net income attributable to the Company per weighted average diluted shares outstanding using the “two-class share method” to calculate such in each given period.

Off-Balance Sheet Arrangements

The Company had no material off-balance sheet items, as defined under Item 303(a)(4) of Regulation S-K as of December 31, 2020. The Company’s only off-balance sheet items outstanding as of December 31, 2020 represented approximately $10 million of total bank letters of credit and guarantees. The bank letters of credit and guarantees are not significant to the Company’s liquidity or capital resources. See Note 20 of Notes to Consolidated Financial Statements in Item 8 of this Report.

Operations

Consolidated Operations Review – Comparison of 2020 with 2019

Net sales were 1,417.7 million in 2020 compared to $1,133.5 million in 2019. The net sales increase of 25% year-over-year includes additional net sales from acquisitions, primarily Houghton and Norman Hay, of $408.6 million. Excluding net sales related to acquisitions, the Company’s current year net sales would have declined approximately 11% which reflects a decrease in sales volumes of 9%, a negative impact from foreign currency translation of 1% and a decrease from selling price and product mix of 1%. The primary driver of the volume decline in the current year was the negative impact of COVID-19 on global production levels.

COGS were $904.2 million in 2020 compared to $741.4 million in 2019. The increase in COGS of 22% was primarily due to the inclusion of a full year of Houghton and Norman Hay COGS and $0.8 million of accelerated depreciation charges in the current year, partially offset by lower current year COGS on the decline in net sales due to COVID-19 and prior year charges of $11.7 million to increase acquired inventory to its fair value, described in the Non-GAAP Measures section of this Item above.

Gross profit in 2020 increased $121.3 million or 31% from 2019 due primarily to additional gross profit from Houghton and Norman Hay. The Company’s reported gross margin in the current period was 36.2% compared to 34.6% in 2019, which included the inventory fair value step up described above. Excluding one-time increases to COGS in both periods, the Company estimates that its gross margins for 2020 and 2019 would have been 36.3% and 35.7%, respectively. The estimated increase in gross margin year-over-year was primarily due to lower COGS as a result of the Company’s progress on Combination-related logistics, procurement and manufacturing cost savings initiatives, partially offset by the lower current year sales volumes on certain fixed manufacturing costs.

SG&A in 2020 increased $96.9 million compared to 2019 due primarily to additional SG&A from Houghton and Norman Hay, partially offset by the impact of COVID-19 cost savings actions, including lower travel expenses, and the benefits of realized costs savings associated with the Combination.

During 2020, the Company incurred $29.8 million of Combination, integration and other acquisition-related expenses, primarily for professional fees related to Houghton integration and other acquisition-related activities. Comparatively, the Company incurred $35.5 million of similar expenses in the prior year, primarily due to various professional fees related to integration planning and regulatory approval as well as professional fees associated with closing the Combination. See the Non-GAAP Measures section of this Item, above.

The Company initiated a restructuring program during the third quarter of 2019 as part of its global plan to realize cost synergies associated with the Combination. The Company recorded additional restructuring and related charges of $5.5 million during 2020 compared to $26.7 million during 2019 under this program. See the Non-GAAP Measures section of this Item, above.

During the first quarter of 2020, the Company recorded a $38.0 million non-cash impairment charge to write down the value of certain indefinite-lived intangible assets associated with the Combination. This non-cash impairment charge is related to certain acquired Houghton trademarks and tradenames and is primarily the result of the current year negative impacts of COVID-19 on their estimated fair values. There were no additional impairment charges in the remainder of 2020 or in the prior year. See the Critical Accounting Policies and Estimates section as well as the Non-GAAP Measures section, of this Item, above.

Operating income in 2020 was $59.4 million compared to $46.1 million in 2019. Excluding Combination, integration and other acquisition-related expenses, restructuring and related charges, the non-cash indefinite-lived intangible asset impairment charge, and other expenses that are not indicative of the Company's future operating performance, the Company's current year non-GAAP operating income of $134.0 million increased compared to $121.9 million in the prior year, primarily due to additional operating income from Houghton and Norman Hay and the benefits from costs savings initiatives related to the Combination, partially offset by the current year negative impact due to COVID-19.

The Company's other expense, net, was $5.6 million in 2020 compared to $0.3 million in 2019. The year-over-year increase in other expense, net was primarily due to the first quarter of 2020 non-cash settlement charge of $22.7 million associated with the termination of the Legacy Quaker U.S. Pension Plan, partially offset by a fourth quarter of 2020 gain of $18.1 million related to the lapsing of restrictions over certain cash that was previously designated solely for the settlement of asbestos claims at an inactive subsidiary of the Company, which are both described in the Non-GAAP Measures section of this Item, above. Additionally, the increase year-over-year in other expense, net, includes higher foreign currency transaction losses in the current year.

Interest expense, net, increased $9.6 million in 2020 compared to 2019 primarily due to a full year of borrowings under the Company's Credit Facility to finance the closing of the Combination on August 1, 2019, partially offset by lower overall interest rates in the current year.

The Company's effective tax rates for 2020 and 2019 were a benefit of 19.5% and an expense of 7.2%, respectively. The Company's current year effective tax rate was impacted by the tax effect of certain one-time tax charges and benefits in the current period, including deferred tax benefits related to an intercompany intangible asset transfer, as well as changes in the valuation allowance for foreign tax credits acquired with the Combination, additional charges for uncertain tax positions relating to certain foreign tax audits, and the tax impact of the Company's termination of its Legacy Quaker U.S. pension plan. Comparatively, the prior year effective tax rate was primarily impacted by certain non-deductible costs associated with the Combination as well as a prior year deferred tax benefit related to a separate intercompany intangible asset transfer. Excluding the impact of all non-core items in each year, described in the Non-GAAP measures section of this Item, above, the Company estimates that its effective tax rates for 2020 and 2019 were approximately 25% and 22%, respectively. The year-over-year increase is driven primarily by higher U.S. income taxes resulting from a change in certain deductions and the taxability of foreign earnings in the U.S., partially offset by a change in the mix of earnings. The Company has experienced and expects to continue to experience volatility in its effective tax rates due to several factors, including the timing of tax audits and the expiration of applicable statutes of limitations as they relate to uncertain tax positions, the unpredictability of the timing and amount of certain incentives in various tax jurisdictions, valuation allowances necessary on certain of the Company's tax positions, the treatment of certain acquisition-related costs and the timing and amount of certain share-based compensation-related tax benefits, among other factors.

Equity in net income of associated companies increased $2.3 million in 2020 compared to 2019, primarily due to additional earnings from our 50% interest in a joint venture in Korea partially offset by lower earnings as compared to the prior year period from the Company's interest in a captive insurance company. See the Non-GAAP Measures section of this Item, above.

Net income attributable to noncontrolling interest was $0.1 million in 2020 compared to $0.3 million in 2019 primarily a result of the first quarter of 2020 acquisition of the remaining ownership interest in one of the Company's South African affiliates.

Foreign exchange negatively impacted the Company's 2020 results by approximately $0.38 per diluted share, primarily due to higher foreign exchange transaction losses year-over-year and, to a lesser extent, an aggregate negative impact from foreign currency translation on earnings.

Consolidated Operations Review – Comparison of 2019 with 2018

Net sales were $1,133.5 million in 2019 compared to $867.5 million in 2018. The net sales increase of 31% year-over-year includes additional net sales from Houghton and Norman Hay of $319.4 million. Excluding Houghton and Norman Hay net sales, the Company's 2019 net sales would have declined 6% compared to the prior year, reflecting a decrease in sales volumes of approximately 3% and a negative impact from foreign currency translation of 3%.

COGS in 2019 of $741.4 million increased approximately $186.2 million or 34% from $555.2 million in 2018. The increase in COGS was primarily due to the inclusion of Houghton and Norman Hay COGS, as well as the fair value inventory step up and accelerated depreciation charges described in the Non-GAAP Measures section of this Item above, partially offset by lower COGS on the decline in Legacy Quaker net sales.

Gross profit in 2019 increased $79.8 million from 2018 due primarily to Houghton and Norman Hay net sales noted above. The Company's reported gross margin in 2019 was 34.6%, which includes an aggregate $11.7 million of expense associated with selling Houghton and Norman Hay acquired inventory adjusted to fair value as well as 2019 accelerated depreciation charges, both of which are described in the Non-GAAP Measures section of this Item above. Excluding these one-time increases to COGS, the Company estimates that its gross margin would have been approximately 35.7% in 2019 compared to 36.0% in 2018. The decrease in gross margin year-over-year was primarily the result of price and product mix attributed to lower Houghton gross margin compared to Legacy Quaker. SG&A in 2019 increased $76.0 million compared to 2018 driven by additional Houghton and Norman Hay SG&A as well as charges related to the settlement of a non-core equipment sale and certain customer bankruptcy costs, both of which are described in the Non-GAAP Measures section of this Item above, partially offset by lower SG&A due to foreign currency translation, the impact of the year-over-year base sales decline noted above on direct selling costs, and the benefits of realized cost savings associated with the Combination.

During 2019, the Company incurred $35.5 million of Combination and other acquisition-related expenses, primarily for legal, financial, and other advisory and consultant expenses for integration planning and regulatory approvals, fees associated with the closing of the Combination and costs associated with various integration activities. Comparatively, the Company incurred $16.7 million of expenses in 2018, primarily due to various professional fees related to integration planning and regulatory approval. See the Non-GAAP Measures section of this Item above.

The Company initiated a restructuring program during the third quarter of 2019 as part of its global plan to realize cost synergies associated with the Combination. The Company expects reductions in headcount and site closures to occur over the next two years under this program. The Company recorded restructuring expense during 2019 of $26.7 million related to this program. There were no similar restructuring expenses recorded during the prior year. See the Non-GAAP Measures section of this Item, above.

Operating income in 2019 was $46.1 million compared to $87.8 million in 2018. Excluding the Combination and other acquisition-related charges, restructuring expenses and other non-core items, described in the Non-GAAP Measures section of this Item, above, the Company's 2019 non-GAAP operating income increased to $121.9 million compared to $104.4 million in 2018, primarily due to additional net sales and operating income from Houghton and Norman Hay.

The Company had other expense, net, of $0.3 million in 2019 compared to $0.6 million in 2018. The decrease in other expense, net, was primarily driven by foreign currency transaction gains in 2019 compared to foreign currency transaction losses in 2018. The Company's 2019 and 2018 foreign currency transaction gains and losses included both recurring transactional activity as well as foreign currency transaction losses of approximately $1.0 million and $0.4 million, respectively, related to the Company's Argentine subsidiaries and, in 2018, a foreign currency transaction gain of approximately $0.4 million related to the liquidation of an inactive legal entity, both of which are described in the Non-GAAP measures section of this Item, above. In addition, the Company had an increase in receipts of local municipality-related grants in one of the Company's regions year-over-year, partially offset by an increase in pension and postretirement benefit costs, non-service components, in 2019 compared to 2018. Lastly, in 2018, the Company recorded a gain of $0.6 million for the sale of a held-for-sale asset.

Interest expense, net, increased $12.9 million in 2019 compared to 2018, primarily as a result of additional borrowings under the Company's Credit Facility to finance the closing of the Combination on August 1, 2019.

The Company's effective tax rates for 2019 and 2018 were 7.2% and 30.1%, respectively. The Company's low 2019 effective tax rate was primarily driven by a one-time deferred tax benefit related to an intercompany intangible asset transfer, described in the Non-GAAP measures section of this Item, above. Comparatively, the Company's higher 2018 effective tax rate was largely driven by combination-related expenses incurred, certain of which were non-deductible for the purpose of determining the Company's effective tax rate, as well as tax charges related to an adjustment to the Company's initial estimate of the impact from U.S. Tax Reform. Excluding the impact of these and all other non-core items in each period, described in the Non-GAAP Measures section of this Item, above, the Company estimates that its effective tax rates would have been approximately 22% in each year.

Equity in net income of associated companies increased $3.3 million in 2019 compared to 2018, primarily due to additional earnings from the Company's 50% interest in a Houghton joint venture in Korea and higher earnings from the Company's interest in a captive insurance company.

Net income attributable to noncontrolling interest was relatively consistent in both 2019 and 2018.

Foreign exchange negatively impacted the Company's 2019 earnings by approximately 2% or $0.09 per diluted share, as the negative impact from foreign currency translation of approximately 3% due to the strengthening of the U.S. dollar in 2019 was partially offset by higher 2019 foreign exchange transaction gains.

Reportable Segments Review – Comparison of 2020 with 2019

The Company's reportable segments reflect the structure of the Company's internal organization, the method by which the Company's resources are allocated and the manner by which the chief operating decision maker assesses the Company's performance. During the third quarter of 2019 and in connection with the Combination, the Company reorganized its executive management team to align with its new business structure which reflects the method by which the Company assesses its performance and allocates its resources. The Company's current reportable segment structure includes four segments: (i) Americas; (ii) EMEA; (iii) Asia/Pacific; and (iv) Global Specialty Businesses. The three geographic segments are composed of the net sales and operations in each respective region, excluding net sales and operations managed globally by the Global Specialty Businesses segment, which includes the Company's container, metal finishing, mining, offshore, specialty coatings, specialty grease and Norman Hay businesses.

Segment operating earnings for each of the Company's reportable segments are comprised of the segment's net sales less directly related COGS and SG&A. Operating expenses not directly attributable to the net sales of each respective segment are not included in segment operating earnings, such as certain corporate and administrative costs, Combination, integration and other acquisition-related expenses, Restructuring and related charges, and COGS related to acquired inventory sold, which is adjusted to fair value as part of purchase accounting. Other items not specifically identified with the Company's reportable segments include interest expense, net and other expense, net. Certain immaterial reclassifications within the segment disclosures for the years ended December 31, 2019 have been made to conform with the Company's current customer industry segmentation and reflected in the prior year comparisons below.

Americas

Americas represented approximately 32% of the Company's consolidated net sales in 2020. The segment's net sales were $450.2 million, an increase of $58.0 million or 15% compared to 2019. The increase in net sales reflects additional net sales from acquisitions of $120.4 million, primarily a result of the inclusion of seven additional months of Houghton net sales, as the Combination closed on August 1 in the prior year. Excluding net sales from acquisitions, the segment's net sales decreased year-over-year by approximately 16% due to lower volumes of 12% and a negative impact of foreign currency translation of 4%. The current year volume decline was driven by the economic slowdown that began in late March and continued throughout 2020 due to the impacts of COVID-19. The foreign exchange impact was primarily due to the weakening of the Brazilian real and the Mexican peso against the U.S. dollar, as these exchange rates averaged 5.10 and 21.34, respectively, in 2020 compared to 3.94 and 19.24, respectively in 2019. This segment's operating earnings were $96.4 million, an increase of $18.1 million or 23% compared to 2019. The increase in segment operating earnings reflects the inclusion of a full year of Houghton net sales, noted, above, and the impacts on gross margins and SG&A due to the Combination's cost synergies and costs savings actions related to COVID-19 year-over-year, partially offset by the impact of COVID-19 on current year sales volumes and higher COGS and SG&A due to seven additional months of Houghton in the current year.

EMEA

EMEA represented approximately 27% of the Company's consolidated net sales in 2020. The segment's net sales were $383.2 million, an increase of $97.6 million or 34% compared to 2019. The increase in net sales reflects additional net sales from acquisitions of $117.9 million, primarily a result of the inclusion of seven additional months of Houghton net sales, as the Combination closed on August 1 in the prior year. Excluding net sales from acquisitions, the segment's net sales decreased year-over-year by approximately 7% due to lower volumes of 10%, partially offset by a positive impact of foreign currency translation of 2% and increases in selling price and product mix of 1%. The current year volume decline was driven by the economic slowdown that began in late March and continued throughout 2020 due to the impacts of COVID-19. The foreign exchange impact was primarily due to the strengthening of the euro against the U.S. dollar as this exchange rate averaged 1.14 in 2020 compared to 1.12 in 2019. This segment's operating earnings were $69.2 million, an increase of $22.1 million or 47% compared to 2019. The increase in segment operating earnings reflects the inclusion of a full year of Houghton net sales, noted, above, and the impacts on gross margins and SG&A due to the Combination's cost synergies and costs savings actions related to COVID-19 year-over-year, partially offset by the impact of COVID-19 on current year sales volumes and higher COGS and SG&A due to seven additional months of Houghton in the current year.

Asia/Pacific

Asia/Pacific represented approximately 22% of the Company's consolidated net sales in 2020. The segment's net sales were $315.3 million, an increase of $67.5 million or 27% compared to 2019. The increase in net sales reflects the inclusion of seven additional months of Houghton net sales of $79.7 million, as the Combination closed on August 1 in the prior year. Excluding Houghton net sales, the segment's net sales decreased by approximately 5% year-over-year was due to lower volumes of 3% and decreases in selling price and product mix of 3% partially offset by the positive impact of foreign currency translation of 1%. The current year volume decline was driven by the economic slowdown that began in the first quarter in China and in late March throughout the rest of the region due to the impacts of COVID-19. The foreign exchange impact was primarily due to the strengthening of the Chinese renminbi against the U.S. dollar. While this exchange rate averaged 6.90 in each of 2020 and 2019, respectively, post the closing of the Combination, this exchange rate strengthened in the last 5 months of 2020 to average 6.72 compared to 7.06 in the last 5 months of 2019, partially offset by the weakening of the Indian rupee against the U.S. dollar as this exchange rate averaged 73.95 in 2020 compared to 70.35 in 2019. This segment's operating earnings were $88.4 million, an increase of $20.8 million or 31% compared to 2019. The increase in segment operating earnings reflects the inclusion of incremental Houghton net sales, noted, above, and the impacts on gross margins and SG&A due to the Combination's cost synergies and costs savings actions related to COVID-19 year-over-year, partially offset by the impact of COVID-19 on current year sales volumes and higher COGS and SG&A due to seven additional months of Houghton in the current year.

Global Specialty Businesses

Global Specialty Businesses represented approximately 19% of the Company's consolidated net sales in 2020. The segment's net sales were $269.0 million, an increase of $61.1 million or 29% compared to 2019. The increase in net sales reflects the inclusion of seven additional months of Houghton net sales and nine additional months of Norman Hay net sales, totaling $90.6 million, as the Combination closed on August 1 and the Norman Hay acquisition closed on October 1 in the prior year. Excluding Houghton and

Norman Hay net sales, the segment's net sales decreased by approximately 14% year-over-year due to lower volumes of 7%, decreases in selling price and product mix of 5% and a negative impact from foreign currency translation of 2%. The current year volume decline was primarily due to a decrease in the Company's specialty coatings business driven by Boeing's decision to temporarily stop production of the 737 Max aircraft and volume declines due to the economic slowdown resulting from COVID-19. Partially offsetting these volume declines, and contributing to the decrease in selling price and product mix, were higher shipments of a lower priced product in the Company's mining business compared to the prior year. The foreign exchange impact was primarily due to the weakening of the Brazilian real against the U.S. dollar described in the Americas section, above. This segment's operating earnings were $79.7 million, an increase of $20.8 million or 35% compared to 2019. The increase in segment operating earnings reflects the inclusion of incremental Houghton and Norman Hay net sales, noted above, coupled with an increase in gross margin due to the Company's progress on Combination-related logistics, procurement and manufacturing cost savings initiatives, partially offset by higher SG&A, including seven additional months of Houghton and nine additional months of Norman Hay SG&A in the current year.

Reportable Segments Review – Comparison of 2019 with 2018

Americas

Americas represented approximately 35% of the Company's consolidated net sales in 2019. The segment's net sales were $392.1 million, an increase of $94.5 million or 32% compared to 2018. The increase in net sales reflects the inclusion of Houghton net sales of $110.1 million. Excluding Houghton net sales, the segment's net sales decrease year-over-year of 5% was due primarily to lower volumes of 6% and a negative impact from foreign currency translation of 1% partially offset by a positive impact from selling price and product mix of 2%. The decline in volumes compared to 2018 was driven by compounding conditions of weak automotive and steel markets, a generally weaker overall industrial environment in the region and some customer inventory corrections. The segment's operating earnings were $78.3 million, an increase of $15.6 million or 25% compared to 2018. The increase in segment operating earnings reflects the inclusion of Houghton net sales, partially offset by a lower gross margin due to price and product mix, including lower Houghton gross margins compared to Legacy Quaker and higher SG&A, including Houghton SG&A.

EMEA

EMEA represented approximately 25% of the Company's consolidated net sales in 2019. The segment's net sales were $285.6 million, an increase of $68.6 million or 32% compared to 2018. The increase in net sales reflects the inclusion of Houghton net sales of $92.5 million. Excluding Houghton net sales, the segment's net sales decrease year-over-year of 11% was due to a negative impact of foreign currency translation of 5%, lower volumes of approximately 5% and a decrease from selling price and product mix of 1%. The foreign exchange impact was primarily due to the weakening of the euro against the U.S. dollar as this exchange rate averaged 1.12 in 2019 compared to 1.18 in 2018. The decline in volumes compared to 2018 was driven by a weak automotive market and the challenging overall industrial environment in the region, as well as a decrease in volume associated with a specific piece of business which the Company stopped selling during the second half of 2018 primarily due to its limited profitability. This segment's operating earnings were $47.0 million, an increase of $10.9 million or 30% compared to 2018. The increase in segment operating earnings reflects the inclusion of Houghton net sales and a slightly higher gross margin, partially offset by higher SG&A, including Houghton SG&A.

Asia/Pacific

Asia/Pacific represented approximately 22% of the Company's consolidated net sales in 2019. The segment's net sales were $247.8 million, an increase of $55.3 million or 29% compared to 2018. The increase in net sales reflects the inclusion of Houghton net sales of $67.4 million. Excluding Houghton net sales, the segment's net sales decreased 6% year-over-year due primarily to the negative impact of foreign currency translation of 3% and lower volumes of approximately 3%. The foreign exchange impact was primarily due to the weakening of the Chinese renminbi and India rupee against the U.S. dollar as these exchange rates averaged 6.90 and 70.3, respectively, in 2019 compared to 6.60 and 68.18, respectively, in 2018. The decline in volumes was driven by weak automotive and steel markets and the challenging overall industrial environment in the region. This segment's operating earnings were $67.5 million, an increase of $13.8 million or 26% compared to 2018. The increase in segment operating earnings reflects the inclusion of Houghton net sales, and relatively consistent gross margins, partially offset by higher SG&A, including Houghton SG&A.

Global Specialty Businesses

Global Specialty Businesses represented approximately 18% of the Company's consolidated net sales in 2019. The segment's net sales were $208.0 million, an increase of $47.5 million or 30% compared to 2018. The increase in net sales reflects the inclusion of Houghton and Norman Hay net sales of $49.4 million. Excluding Houghton and Norman Hay net sales, the segment's net sales decreased 1% year-over-year driven by a decline in selling price and product mix of 5% and a negative impact from foreign currency translation of less than 1% partially offset by an increase in volume of 4%. This segment's operating earnings were $58.9 million, an increase of approximately $15.9 million or 37% compared to 2018. The increase in segment operating earnings reflects the inclusion of Houghton and Norman Hay net sales, and relatively consistent gross margins, partially offset by higher SG&A, including Houghton and Norman Hay.

Environmental Clean-up Activities

The Company is involved in environmental clean-up activities in connection with an existing plant location and former waste disposal sites. This includes certain soil and groundwater contamination the Company identified in 1992 at AC Products, Inc. ("ACP"), a wholly owned subsidiary. In voluntary coordination with the Santa Ana California Regional Water Quality Board, ACP has been remediating the contamination. In 2007, ACP agreed to operate two groundwater treatment systems, so as to hydraulically contain groundwater contamination emanating from ACP's site until such time as the concentrations of contaminants are below the current Federal maximum contaminant level for four consecutive quarterly sampling events. In 2014, ACP ceased operation at one of its two groundwater treatment systems, as it had met the above condition for closure. In 2020, the Santa Ana Regional Water Quality Control Board asked that ACP conduct some additional indoor and outdoor soil vapor testing on and near the ACP site to confirm that ACP continues to meet the applicable local standards and ACP has begun the testing program. As of December 31, 2020, ACP believes it is close to meeting the conditions for closure of the remaining groundwater treatment system, but continues to operate this system while in discussions with the relevant authorities. As of December 31, 2020, the Company believes that the range of potential-known liabilities associated with the balance of the ACP water remediation program is approximately $0.1 million to $1.0 million. The low and high ends of the range are based on the length of operation of the treatment system as determined by groundwater modeling.

As a result of the closing of the Combination on August 1, 2019, the Company is party to environmental matters related to certain Houghton domestic and foreign properties currently or previously owned. Houghton's Sao Paulo, Brazil site was required under Brazilian environmental, health and safety regulations to perform an environmental assessment as part of a permit renewal process. Initial investigations identified soil and ground water contamination in select areas of the site. The site has conducted a multi-year soil and groundwater investigation and corresponding risk assessments based on the result of the investigations. In 2017, the site had to submit a new 5-year permit renewal request and was asked to complete additional investigations to further delineate the site based on review of the technical data by the local regulatory agency, Companhia Ambiental do Estado de São Paulo ("CETESB"). Based on review of the updated investigation data, CETESB issued a Technical Opinion regarding the investigation and remedial actions taken to date. The site developed an action plan and submitted it to CETESB in 2018 based on CETESB requirements. The site intervention plan primarily requires the site, among other actions, to conduct periodic monitoring for methane in soil vapors, source zone delineation, groundwater plume delineation, bedrock aquifer assessment, update the human health risk assessment, develop a current site conceptual model and conduct a remedial feasibility study and provide a revised intervention plan. In December 2019, the site submitted a report on the activities completed including the revised site conceptual model and results of the remedial feasibility study and recommended remedial strategy for the site. Other Houghton environmental matters include participation in certain payments in connection with four currently active environmental consent orders related to certain hazardous waste cleanup activities under the U.S. Federal Superfund statute. Houghton has been designated a potentially responsible party ("PRP") by the Environmental Protection Agency along with other PRPs depending on the site, and has other obligations to perform cleanup activities at certain other foreign subsidiaries. These environmental matters primarily require the Company to perform long-term monitoring as well as operating and maintenance at each of the applicable sites.

The Company continually evaluates its obligations related to such matters and, based on historical costs incurred and projected costs to be incurred over the next 28 years, has estimated the present value range of costs for all of the Houghton environmental matters, on a discounted basis, to be between approximately $5.5 million and $6.5 million as of December 31, 2020, for which $6.0 million is accrued within other accrued liabilities and other non-current liabilities on the Company's Consolidated Balance Sheet as of December 31, 2020. Comparatively, as of December 31, 2019, the Company had $6.6 million accrued with respect to these matters.

The Company believes, although there can be no assurance regarding the outcome of other unrelated environmental matters, that it has made adequate accruals for costs associated with other environmental problems of which it is aware. Approximately $0.1 million and $0.2 million were accrued as of December 31, 2020 and 2019, respectively, to provide for such anticipated future environmental assessments and remediation costs.

Notwithstanding the foregoing, the Company cannot be certain that future liabilities in the form of remediation expenses and damages will not exceed amounts reserved. See Note 26 of Notes to Consolidated Financial Statements in Item 8 of this Report

General

See Item 7A of this Report, below, for further discussion of certain quantitative and qualitative disclosures about market risk.

Item 7A. *Quantitative and Qualitative Disclosures About Market Risk.*

Quaker Houghton is exposed to the impact of interest rates, foreign currency fluctuations, changes in commodity prices, and credit risk. The current economic environment associated with COVID-19 has led to significant volatility and uncertainty with each of these market risks. See Item 1A. "Risk Factors." of this Report for additional discussions of the current and potential risks associated with the COVID-19 pandemic. Except as otherwise disclosed below, the market risks discussed below did not change materially from December 31, 2019.

Interest Rate Risk. The Company's exposure to changes in interest rates relates primarily to its borrowings under the Credit Facility as of December 31, 2020 and 2019. Borrowings under the Credit Facility bear interest at a base rate or LIBOR plus an applicable margin based upon the Company's consolidated net leverage ratio. As a result of the variable interest rates applicable under the Credit Facility, if interest rates rise significantly, the cost of debt to the Company could increase as well. This could have an adverse effect on the Company, depending on the extent of the Company's borrowings outstanding throughout a given year. As of December 31, 2020, the Company had outstanding borrowings under the Credit Facility of approximately $887.1 million. The variable interest rate incurred on the outstanding borrowings under the Credit Facility during the year ended December 31, 2020 was approximately 2.2%. If interest rates had changed by 10% during 2020, the Company's interest expense for the period ended December 31, 2020 on its credit facilities, including the Credit Facility borrowings outstanding post-closing of the Combination, would have correspondingly increased or decreased by approximately $0.8 million.

The Credit Facility required the Company to fix its variable interest rates on at least 20% of its total Term Loans. In order to satisfy this requirement as well as to manage the Company's exposure to variable interest rate risk associated with the Credit Facility, in November 2019, the Company entered into $170.0 million notional amounts of three-year interest rate swaps at a base rate of 1.64% plus an applicable margin as provided in the Credit Facility, based on the Company's consolidated net leverage ratio. At the time the Company entered into the swaps and as of December 31, 2020, the aggregate interest rate on the swaps, including the fixed base rate plus an applicable margin, was 3.1%. These interest rate swaps are designated and qualify as cash flow hedges. The Company has previously used derivative financial instruments primarily for the purpose of hedging exposures to fluctuations in interest rates.

Foreign Exchange Risk. A significant portion of the Company's revenues and earnings are generated by its foreign operations. These foreign operations also represent a significant portion of Quaker Houghton's assets and liabilities. Generally, all of these foreign operations use the local currency as their functional currency. Accordingly, Quaker Houghton's financial results are affected by foreign currency fluctuations, particularly between the U.S. dollar and the euro, the British pound sterling, the Brazilian real, the Mexican peso, the Chinese renminbi and the Indian rupee. Quaker Houghton's results can be materially affected depending on the volatility and magnitude of foreign exchange rate changes. If the euro, the British pound sterling, the Brazilian real, the Mexican peso, the Chinese renminbi and the Indian rupee had all weakened or strengthened by 10% against the U.S. dollar, the Company's 2020 revenues and pre-tax earnings would have correspondingly decreased or increased by approximately $78.9 million and $7.4 million, respectively.

The Company generally does not use financial instruments that expose it to significant risk involving foreign currency transactions. However, the size of its non-U.S. activities has a significant impact on reported operating results and the attendant net assets. During the past three years, sales by its non-U.S. subsidiaries accounted for approximately 60% to 70% of its consolidated net sales. In addition, the Company occasionally sources inventory among its worldwide operations. This practice can give rise to foreign exchange risk resulting from the varying cost of inventory to the receiving location, as well as from the revaluation of intercompany balances. The Company primarily mitigates this risk through local sourcing efforts.

Commodity Price Risk. Many of the raw materials used by Quaker Houghton are derivatives of commodity chemicals, which can experience significant price volatility, and therefore Quaker Houghton's earnings can be materially affected by market changes in raw material prices. At times, the Company has entered into fixed-price purchase contracts to manage this risk. These contracts provide protection to Quaker Houghton if the prices for the contracted raw materials rise; however, in certain circumstances, the Company may not realize the benefit if such prices decline. A gross margin change of one percentage point, would correspondingly have increased or decreased the Company's pre-tax earnings by approximately $14.2 million.

Credit Risk. Quaker Houghton establishes allowances for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments. If the financial condition of Quaker Houghton's customers were to deteriorate, resulting in an impairment of their ability to make payments, additional allowances might be required. Downturns in the overall economic climate may also exacerbate specific customer financial issues. A significant portion of the Company's revenues are derived from sales to customers in the steel and automotive industries, including some of our larger customers, where bankruptcies have occurred in the past and where companies have experienced past financial difficulties. Though infrequent, when a bankruptcy occurs, Quaker Houghton must judge the amount of proceeds, if any, that may ultimately be received through the bankruptcy or liquidation process. In addition, as part of its terms of trade, Quaker Houghton may custom manufacture products for certain large customers and/or may ship product on a consignment basis. These practices may increase the Company's exposure should a bankruptcy occur and may require a write-down or disposal of certain inventory due to its estimated obsolescence or limited marketability as well as of accounts receivable. Customer returns of products or disputes may also result in similar issues related to the realizability of recorded accounts receivable or returned inventory. The Company recorded expense to its provision for doubtful accounts by $3.6 million, $1.9 million and $0.5 million for the years ended December 31, 2020, 2019 and 2018, respectively. A change of 10% to the expense recorded to the Company's provision would have increased or decreased the Company's pre-tax earnings by $0.4 million, $0.2 million and $0.1 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Item 8. ***Financial Statements and Supplementary Data.***

QUAKER CHEMICAL CORPORATION
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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Quaker Chemical Corporation

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Quaker Chemical Corporation and its subsidiaries (the "Company") as of December 31, 2020 and 2019, and the related consolidated statements of income, of comprehensive income, of changes in equity and of cash flows for each of the three years in the period ended December 31, 2020, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company did not maintain, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO because material weaknesses in internal control over financial reporting existed as of that date as the Company did not design and maintain effective controls (i) in response to the risks of material misstatement and (ii) over the review of pricing, quantity and customer data to verify that revenue recognized was complete and accurate.

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 the annual or interim financial statements will not be prevented or detected on a timely basis. The material weaknesses referred to above are described in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. We considered these material weaknesses in determining the nature, timing, and extent of audit tests applied in our audit of the 2020 consolidated financial statements, and our opinion regarding the effectiveness of the Company's internal control over financial reporting does not affect our opinion on those consolidated financial statements.

Change in Accounting Principle

As discussed in Note 6 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in management's report referred to above. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As described in Management's Report on Internal Control over Financial Reporting, management has excluded Tel Nordic ApS and Coral Chemical Company from its assessment of internal control over financial reporting as of December 31, 2020, because they were acquired by the Company in purchase business combinations during 2020. These excluded entities are wholly owned subsidiaries, whose total assets represent less than 1% and approximately 2%, respectively, and whose total revenues each represent less than 1%, of the related consolidated financial statement amounts as of and for the year ended December 31, 2020.

Definition and Limitations of Internal Control over Financial Reporting

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

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

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Houghton Trademarks and Tradename Impairment Assessments

As described in Note 16 to the consolidated financial statements, the Company's consolidated Other intangible assets, net balance was $1,081.4 million as of December 31, 2020, and the indefinite-lived intangible asset was $205.1 million, which substantially relates to the Houghton trademarks and tradename. Management completes its annual indefinite-lived intangible asset impairment test during the fourth quarter of each year, or more frequently if triggering events indicate a potential impairment. An impairment exists when it is determined that it is more likely than not that the indefinite-lived intangible asset carrying value exceeds its fair value and is not recoverable. In the first quarter of 2020, as a result of the impact of COVID-19 driving a decrease in projected legacy Houghton net sales in the current year and the impact of the current year decline on projected future legacy Houghton net sales as well as an increase in the weighted average cost of capital ("WACC") assumption utilized in the quantitative impairment assessment, the Company concluded that the estimated fair value of the Houghton trademarks and tradename intangible asset was less than its carrying value. As a result, an impairment charge of $38.0 million, primarily related to the Houghton trademarks and tradename, was recorded in the first quarter of 2020. The Company completed its annual impairment assessment during the fourth quarter of 2020 for the Houghton trademarks and tradename and concluded no impairment charge was warranted. The determination of estimated fair value of the Houghton trademarks and tradename is based on a relief from royalty valuation method which requires management's judgment and often involves the use of significant estimates and assumptions with respect to the WACC and royalty rates, as well as revenue growth rates and terminal growth rates.

The principal considerations for our determination that performing procedures relating to the Houghton trademarks and tradename impairment assessments is a critical audit matter are (i) the significant judgment by management when determining the fair value measurement of the Houghton trademarks and tradename; (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating management's significant assumptions related to the WACC, royalty rates, revenue growth rates and terminal growth rates; and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to management's indefinite-lived intangible assets impairment assessments, including controls over the valuation of the Houghton trademarks and tradename. These procedures also included, among others (i) testing management's process for determining the fair value estimate; (ii) evaluating the appropriateness of the relief from royalty valuation method; (iii) testing the completeness and accuracy of underlying data used in the estimate; and (iv) evaluating the reasonableness of significant assumptions related to the WACC, royalty rates, revenue growth rates and terminal growth rates. Evaluating management's assumptions related to the royalty rates, revenue growth rates and terminal growth rates involved evaluating whether the assumptions used by management were reasonable considering (i) the current and past performance of the legacy Houghton business; (ii) the consistency with external market and industry data; and (iii) whether these assumptions were consistent with evidence obtained in other areas of the audit. Professionals with specialized skill and knowledge were used to assist in evaluating the appropriateness of the relief from royalty valuation method and evaluating the reasonableness of royalty rates and the WACC.

/s/PricewaterhouseCoopers LLP
Philadelphia, Pennsylvania
March 1, 2021

We have served as the Company's auditor since at least 1972. We have not been able to determine the specific year we began serving as auditor of the Company.

QUAKER CHEMICAL CORPORATION
CONSOLIDATED STATEMENTS OF INCOME
(*Dollars in thousands, except per share data*)

	Year Ended December 31,		
	2020	**2019**	**2018**
Net sales	$ 1,417,677	$ 1,133,503	$ 867,520
Cost of goods sold (excluding amortization expense - See Note 16)	904,234	741,386	555,206
Gross profit	513,443	392,117	312,314
Selling, general and administrative expenses	380,752	283,828	207,872
Indefinite-lived intangible asset impairment	38,000	—	—
Restructuring and related charges	5,541	26,678	—
Combination, integration and other acquisition-related expenses	29,790	35,477	16,661
Operating income	59,360	46,134	87,781
Other expense, net	(5,618)	(254)	(642)
Interest expense, net	(26,603)	(16,976)	(4,041)
Income before taxes and equity in net income of associated companies	27,139	28,904	83,098
Taxes on income before equity in net income of associated companies	(5,296)	2,084	25,050
Income before equity in net income of associated companies	32,435	26,820	58,048
Equity in net income of associated companies	7,352	5,064	1,763
Net income	39,787	31,884	59,811
Less: Net income attributable to noncontrolling interest	129	262	338
Net income attributable to Quaker Chemical Corporation	$ 39,658	$ 31,622	$ 59,473
Per share data:			
Net income attributable to Quaker Chemical Corporation common shareholders – basic	$ 2.23	$ 2.08	$ 4.46
Net income attributable to Quaker Chemical Corporation common shareholders – diluted	$ 2.22	$ 2.08	$ 4.45

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

QUAKER CHEMICAL CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(*Dollars in thousands*)

	Year Ended December 31,		
	2020	**2019**	**2018**
Net income	$ 39,787	$ 31,884	$ 59,811
Other comprehensive income (loss), net of tax			
Currency translation adjustments	41,601	4,779	(17,519)
Defined benefit retirement plans			
Net gain (loss) arising during the period, other	8,827	(6,289)	1,119
Amortization of actuarial loss	2,308	2,458	2,507
Amortization of prior service gain	(69)	(151)	(84)
Current period change in fair value of derivatives	(3,278)	(320)	—
Unrealized gain (loss) on available-for-sale securities	2,091	2,093	(1,728)
Other comprehensive income (loss)	51,480	2,570	(15,705)
Comprehensive income	91,267	34,454	44,106
Less: Comprehensive income attributable to noncontrolling interest	(37)	(287)	(248)
Comprehensive income attributable to Quaker Chemical Corporation	$ 91,230	$ 34,167	$ 43,858

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

QUAKER CHEMICAL CORPORATION
CONSOLIDATED BALANCE SHEETS
(*Dollars in thousands, except par value and share amounts*)

	December 31,	
	2020	**2019**
ASSETS		
Current assets		
Cash and cash equivalents	$ 181,833	$ 123,524
Accounts receivable, net	372,974	375,982
Inventories, net	187,764	174,950
Prepaid expenses and other current assets	50,156	41,516
Total current assets	792,727	715,972
Property, plant and equipment, net	203,883	213,469
Right of use lease assets	38,507	42,905
Goodwill	631,212	607,205
Other intangible assets, net	1,081,358	1,121,765
Investments in associated companies	95,785	93,822
Deferred tax assets	16,566	14,745
Other non-current assets	31,796	40,433
Total assets	$ 2,891,834	$ 2,850,316
LIABILITIES AND EQUITY		
Current liabilities		
Short-term borrowings and current portion of long-term debt	$ 38,967	$ 38,332
Accounts payable	191,821	164,101
Dividends payable	7,051	6,828
Accrued compensation	43,300	45,620
Accrued restructuring	8,248	18,043
Accrued pension and postretirement benefits	1,466	3,405
Other accrued liabilities	92,107	83,605
Total current liabilities	382,960	359,934
Long-term debt	849,068	882,437
Long-term lease liabilities	27,070	31,273
Deferred tax liabilities	192,763	211,094
Non-current accrued pension and postretirement benefits	63,890	56,828
Other non-current liabilities	55,169	66,384
Total liabilities	1,570,920	1,607,950
Commitments and contingencies (Note 26)		
Equity		
Common stock, $ 1.00 par value; authorized 30,000,000 shares; issued and outstanding		
2020 – 17,850,616 shares; 2019 – 17,735,162 shares	17,851	17,735
Capital in excess of par value	905,171	888,218
Retained earnings	423,940	412,979
Accumulated other comprehensive loss	(26,598)	(78,170)
Total Quaker shareholders’ equity	1,320,364	1,240,762
Noncontrolling interest	550	1,604
Total equity	1,320,914	1,242,366
Total liabilities and equity	$ 2,891,834	$ 2,850,316

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

QUAKER CHEMICAL CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(*Dollars in thousands*)

	Year Ended December 31,		
	2020	**2019**	**2018**
Cash flows from operating activities			
Net income	$ 39,787	$ 31,884	$ 59,811
Adjustments to reconcile net income to net cash provided by operating activities:			
Amortization of debt issuance costs	4,749	1,979	70
Depreciation and amortization	83,246	44,895	19,714
Equity in undistributed earnings of associated companies, net of dividends	4,862	(2,115)	2,784
Acquisition-related fair value adjustments related to inventory	229	11,714	—
Deferred income taxes	(38,281)	(24,242)	8,197
Uncertain tax positions (non-deferred portion)	1,075	958	(89)
Non-current income taxes payable	—	856	(8,181)
Deferred compensation and other, net	(471)	(6,789)	2,914
Share-based compensation	10,996	4,861	3,724
Loss (gain) on disposal of property, plant, equipment and other assets	871	(58)	(657)
Insurance settlement realized	(1,035)	(822)	(1,055)
Indefinite-lived intangible asset impairment	38,000	—	—
Gain on inactive subsidiary litigation and settlement reserve	(18,144)	—	—
Combination and other acquisition-related expenses, net of payments	860	(14,414)	2,727
Restructuring and related charges	5,541	26,678	—
Pension and other postretirement benefits	16,535	46	(1,392)
Increase (decrease) in cash from changes in current assets and current liabilities, net of acquisitions:			
Accounts receivable	17,170	19,926	(2,822)
Inventories	(3,854)	10,844	(10,548)
Prepaid expenses and other current assets	927	(4,640)	(1,540)
Change in restructuring liabilities	(15,745)	(8,899)	—
Accounts payable and accrued liabilities	22,308	(8,915)	190
Estimated taxes on income	8,763	(1,373)	4,932
Net cash provided by operating activities	178,389	82,374	78,779
Cash flows from investing activities			
Investments in property, plant and equipment	(17,901)	(15,545)	(12,886)
Payments related to acquisitions, net of cash acquired	(56,230)	(893,412)	(500)
Proceeds from disposition of assets	2,702	103	866
Insurance settlement interest earned	44	222	162
Net cash used in investing activities	(71,385)	(908,632)	(12,358)
Cash flows from financing activities			
Payments of long-term debt	(37,615)	—	—
Proceeds from term loan debt	—	750,000	—
(Repayments) borrowings on revolving credit facilities, net	(11,485)	147,135	(21,120)
Repayments on other debt, net	(661)	(8,798)	(5,671)
Financing-related debt issuance costs	—	(23,747)	—
Dividends paid	(27,563)	(21,830)	(19,319)
Stock options exercised, other	3,867	1,370	82
Purchase of noncontrolling interest in affiliates	(1,047)	—	—
Distributions to noncontrolling affiliate shareholders	(751)	—	(877)
Net cash (used in) provided by financing activities	(75,255)	844,130	(46,905)
Effect of foreign exchange rate changes on cash	6,591	1,258	(6,141)
Net increase in cash, cash equivalents and restricted cash	38,340	19,130	13,375
Cash, cash equivalents and restricted cash at the beginning of the period	143,555	124,425	111,050
Cash, cash equivalents and restricted cash at the end of the period	$ 181,895	$ 143,555	$ 124,425
Supplemental cash flow disclosures:			
Cash paid during the year for:			
Income taxes, net of refunds	$ 20,253	$ 15,499	$ 19,617
Interest	23,653	19,553	2,417
Non-cash activities:			
Change in accrued purchases of property, plant and equipment, net	$ (1,376)	$ 1,978	$ 281

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

QUAKER CHEMICAL CORPORATION
CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY
(*Dollars in thousands, except per share amounts*)

	Common stock	Capital in excess of par value	Retained earnings	Accumulated other comprehensive loss	Noncontrolling interest	Total
Balance as of December 31, 2017	$ 13,308	93,528	365,936	(65,100)	1,946	$ 409,618
Cumulative effect of an accounting change	—	—	(754)	—	—	(754)
Balance as of January 1, 2018	13,308	93,528	365,182	(65,100)	1,946	408,864
Net income	—	—	59,473	—	338	59,811
Amounts reported in other comprehensive loss	—	—	—	(15,615)	(90)	(15,705)
Dividends declared ($1.465 per share)	—	—	(19,530)	—	—	(19,530)
Distributions to noncontrolling affiliate shareholders	—	—	—	—	(877)	(877)
Shares issued upon exercise of stock options and other	9	(432)	—	—	—	(423)
Shares issued for employee stock purchase plan	3	502	—	—	—	505
Share-based compensation plans	18	3,706	—	—	—	3,724
Balance as of December 31, 2018	13,338	97,304	405,125	(80,715)	1,317	436,369
Cumulative effect of an accounting change	—	—	(44)	—	—	(44)
Balance as of January 1, 2019	13,338	97,304	405,081	(80,715)	1,317	436,325
Net income	—	—	31,622	—	262	31,884
Amounts reported in other comprehensive income	—	—	—	2,545	25	2,570
Dividends declared ($1.525 per share)	—	—	(23,724)	—	—	(23,724)
Shares issued related to the Combination	4,329	784,751	—	—	—	789,080
Shares issued upon exercise of stock options and other	23	871	—	—	—	894
Shares issued for employee stock purchase plan	3	473	—	—	—	476
Share-based compensation plans	42	4,819	—	—	—	4,861
Balance as of December 31, 2019	17,735	888,218	412,979	(78,170)	1,604	1,242,366
Cumulative effect of an accounting change	—	—	(911)	—	—	(911)
Balance as of January 1, 2020	17,735	888,218	412,068	(78,170)	1,604	1,241,455
Net income	—	—	39,658	—	129	39,787
Amounts reported in other comprehensive income	—	—	—	51,572	(92)	51,480
Dividends declared ($1.5600 per share)	—	—	(27,786)	—	—	(27,786)
Acquisition of noncontrolling interest	—	(707)	—	—	(340)	(1,047)
Distributions to noncontrolling affiliate shareholders	—	—	—	—	(751)	(751)
Shares issued upon exercise of stock options and other	66	6,714	—	—	—	6,780
Share-based compensation plans	50	10,946	—	—	—	10,996
Balance as of December 31, 2020	$ 17,851	$ 905,171	$ 423,940	$ (26,598)	$ 550	$ 1,320,914

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

Note 1 – Significant Accounting Policies

As used in these Notes to Consolidated Financial Statements, the terms "Quaker", "Quaker Houghton", the "Company", "we", and "our" refer to Quaker Chemical Corporation (doing business as Quaker Houghton), its subsidiaries, and associated companies, unless the context otherwise requires. As used in these Notes to Consolidated Financial Statements, the term Legacy Quaker refers to the Company prior to the closing of its combination with Houghton International, Inc. ("Houghton") (herein referred to as the "Combination").

Principles of consolidation: All majority-owned subsidiaries are included in the Company's consolidated financial statements, with appropriate elimination of intercompany balances and transactions. Investments in associated companies (less than majority-owned and in which the Company has significant influence) are accounted for under the equity method. The Company's share of net income or losses in these investments in associated companies is included in the Consolidated Statements of Income. The Company periodically reviews these investments for impairments and, if necessary, would adjust these investments to their fair value when a decline in market value or other impairment indicators are deemed to be other than temporary. See Note 17 of Notes to Consolidated Financial Statements. The Company is not the primary beneficiary of any variable interest entities ("VIEs") and therefore the Company's consolidated financial statements do not include the accounts of any VIEs.

Translation of foreign currency: Assets and liabilities of non-U.S. subsidiaries and associated companies are translated into U.S. dollars at the respective rates of exchange prevailing at the end of the year. Income and expense accounts are translated at average exchange rates prevailing during the year. Translation adjustments resulting from this process are recorded directly in equity as accumulated other comprehensive (loss) income ("AOCI") and will be included as income or expense only upon sale or liquidation of the underlying entity or asset. Generally, all of the Company's non-U.S. subsidiaries use their local currency as their functional currency.

Cash and cash equivalents: The Company invests temporary and excess funds in money market securities and financial instruments having maturities within 90 days. The Company considers all highly liquid investments with original maturities of three months or less to be cash equivalents. The Company has not experienced losses from the aforementioned investments.

Inventories: Inventories are valued at the lower of cost or net realizable value, and are valued using the first-in, first-out method. See Note 14 of Notes to Consolidated Financial Statements.

Long-lived assets: Property, plant and equipment ("PP&E") are stated at gross cost, less accumulated depreciation. Depreciation is computed using the straight-line method on an individual asset basis over the following estimated useful lives: buildings and improvements, 10 to 45 years; and machinery and equipment, 1 to 15 years. The carrying values of long-lived assets are evaluated whenever changes in circumstances or current events indicate the carrying amount of such assets may not be recoverable. An estimate of undiscounted cash flows produced by the asset, or the appropriate group of assets, is compared with the carrying value to determine whether an impairment exists. If necessary, the Company recognizes an impairment loss for the difference between the carrying amount of the assets and their estimated fair value. Fair value is based on current and anticipated future cash flows. Upon sale or other dispositions of long-lived assets, the applicable amounts of asset cost and accumulated depreciation are removed from the accounts and the net amount, less proceeds from disposals, is recorded in the Consolidated Statements of Income. Expenditures for renewals or improvements that increase the estimated useful life or capacity of the assets are capitalized, whereas expenditures for repairs and maintenance are expensed when incurred. See Notes 9 and 15 of Notes to Consolidated Financial Statements.

Capitalized software: The Company capitalizes certain costs in connection with developing or obtaining software for internal use, depending on the associated project. These costs are amortized over a period of 3 to 5 years once the assets are ready for their intended use. In connection with the implementations and upgrades to the Company's global transaction, consolidation and other related systems, approximately $2.3 million and $2.6 million of net costs were capitalized in PP&E on the Company's Consolidated Balance Sheets at December 31, 2020 and 2019, respectively.

Goodwill and other intangible assets: The Company records goodwill, definite-lived intangible assets and indefinite-lived intangible assets at fair value at the date of acquisition. Goodwill and indefinite-lived intangible assets are not amortized but tested for impairment at least annually. These tests will be performed more frequently if triggering events indicate potential impairment. Definite-lived intangible assets are amortized on a straight-line basis over their estimated useful lives, generally for periods ranging from 4 to 20 years. The Company continually evaluates the reasonableness of the useful lives of these assets, consistent with the discussion of long-lived assets, above. See Note 16 of Notes to Consolidated Financial Statements.

Revenue recognition: The Company applies the Financial Accounting Standards Board's ("FASB's") guidance on revenue recognition which requires the Company to recognize revenue in an amount that reflects the consideration to which the Company expects to be entitled in exchange for goods or services transferred to its customers. To do this, the Company applies the five-step model in the FASB's guidance, which requires the Company to: (i) identify the contract with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when, or as, the Company satisfies a performance obligation. See Note 5 of Notes to Consolidated Financial Statements.

Accounts receivable and allowance for doubtful accounts: Trade accounts receivable subject the Company to credit risk. Trade accounts receivable are recorded at the invoiced amount and generally do not bear interest. The allowance for doubtful accounts is the Company's best estimate of the amount of expected credit losses with its existing accounts receivable. The Company adopted ASU 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* on a modified retrospective basis, effective January 1, 2020. See Note 3 of Notes to the Consolidated Financial Statements.

The Company recognizes an allowance for credit losses, which represents the portion of the receivable that the Company does not expect to collect over its contractual life, considering past events and reasonable and supportable forecasts of future economic conditions. The Company's allowance for credit losses on its trade accounts receivable is based on specific collectability facts and circumstances for each outstanding receivable and customer, the aging of outstanding receivables, and the associated collection risk the Company estimates for certain past due aging categories, and also, the general risk to all outstanding accounts receivable based on historical amounts determined to be uncollectible. The Company does not have any off-balance-sheet credit exposure related to its customers. See Note 13 of Notes to Consolidated Financial Statements.

Research and development costs Research and development costs are expensed as incurred and are included in selling, general and administrative expenses ("SG&A"). Research and development expenses were $40.0 million, $32.1 million and $24.5 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Environmental liabilities and expenditures: Accruals for environmental matters are recorded when it is probable that a liability has been incurred and the amount of the liability can be reasonably estimated. If there is a range of estimated liability and no amount in that range is considered more probable than another, then the Company records the lowest amount in the range in accordance with generally accepted accounting principles in the United States ("U.S. GAAP"). Environmental costs and remediation costs are capitalized if the costs extend the life, increase the capacity or improve safety or efficiency of the property from the date acquired or constructed, and/or mitigate or prevent contamination in the future. See Note 26 of Notes to Consolidated Financial Statements.

Asset retirement obligations: The Company follows the FASB's guidance regarding asset retirement obligations, which addresses the accounting and reporting for obligations associated with the retirement of tangible long-lived assets and the associated retirement costs. Also, the Company follows the FASB's guidance for conditional asset retirement obligations ("CARO"), which relates to legal obligations to perform an asset retirement activity in which the timing and (or) method of settlement are conditional on a future event that may or may not be within the control of the entity. In accordance with this guidance, the Company records a liability when there is enough information regarding the timing of the CARO to perform a probability-weighted discounted cash flow analysis. As of December 31, 2020 and 2019, the Company had limited exposure to such obligations and had immaterial liabilities recorded for such on its Consolidated Balance Sheets.

Pension and other postretirement benefits: The Company maintains various noncontributory retirement plans, covering a portion of its employees in the U.S. and certain other countries, including the Netherlands, the United Kingdom ("U.K."), Mexico, Sweden, Germany and France. These retirement plans are subject to the provisions of FASB's guidance regarding employers' accounting for defined benefit pension plans. The plans of the remaining non-U.S. subsidiaries are, for the most part, either fully insured or integrated with the local governments' plans and are not subject to the provisions of the guidance. The guidance requires that employers recognize on a prospective basis the funded status of their defined benefit pension and other postretirement plans on their consolidated balance sheet and, also, recognize as a component of AOCI, net of tax, the gains or losses and prior service costs or credits that arise during the period but are not recognized as components of net periodic benefit cost. In addition, the guidance requires that an employer recognize a settlement charge in their consolidated statement of income when certain events occur, including plan termination or the settlement of certain plan liabilities. A settlement charge represents the immediate recognition into expense of a portion of the unrecognized loss within AOCI on the balance sheet in proportion to the share of the projected benefit obligation that was settled. The Company's Legacy Quaker U.S. pension plan year ends on November 30 and the measurement date is December 31. The measurement date for the Company's other postretirement benefits plan is December 31.

The Company's global pension investment policies are designed to ensure that pension assets are invested in a manner consistent with meeting the future benefit obligations of the pension plans and maintaining compliance with various laws and regulations including the Employee Retirement Income Security Act of 1974. The Company establishes strategic asset allocation percentage targets and benchmarks for significant asset classes with the aim of achieving a prudent balance between return and risk. The Company's investment horizon is generally long term, and, accordingly, the target asset allocations encompass a long-term perspective of capital markets, expected risk and return and perceived future economic conditions while also considering the profile of plan liabilities. To the extent feasible, the short-term investment portfolio is managed to match the short-term obligations, the intermediate portfolio duration is matched to reduce the risk of volatility in intermediate plan distributions, and the total return portfolio is managed to maximize the long-term real growth of plan assets. The critical investment principles of diversification, assessment of risk and targeting the optimal expected returns for given levels of risk are applied. The Company's investment guidelines prohibit the use of securities such as letter stock and other unregistered securities, commodities or commodity contracts, short sales, margin transactions, private placements (unless specifically addressed by addendum), or any derivatives, options or futures for the purpose of portfolio leveraging.

The target asset allocation is reviewed periodically and is determined based on a long-term projection of capital market outcomes, inflation rates, fixed income yields, returns, volatilities and correlation relationships. The interaction between plan assets and benefit obligations is periodically studied to assist in establishing such strategic asset allocation targets. Asset performance is monitored with an overall expectation that plan assets will meet or exceed benchmark performance over rolling five-year periods. The Company's pension committee, as authorized by the Company's Board of Directors, has discretion to manage the assets within established asset allocation ranges approved by senior management of the Company. See Note 21 of Notes to Consolidated Financial Statements.

Comprehensive income (loss): The Company presents other comprehensive income (loss) in its Statements of Comprehensive Income. The Company follows the FASB's guidance regarding the disclosure of reclassifications from AOCI which requires the disclosure of significant amounts reclassified from each component of AOCI, the related tax amounts and the income statement line items affected by such reclassifications. See Note 23 of Notes to Consolidated Financial Statements.

Income taxes and uncertain tax positions: The provision for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid. The provision for income taxes represents income taxes paid or payable for the current year and the change in deferred taxes during the year. Deferred taxes result from differences between the financial and tax bases of the Company's assets and liabilities and are adjusted for changes in tax rates and tax laws when changes are enacted. Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not that a tax benefit will not be realized. The FASB's guidance regarding accounting for uncertainty in income taxes prescribes the recognition threshold and measurement attributes for financial statement recognition and measurement of tax positions taken or expected to be taken on a tax return. The guidance further requires the determination of whether the benefits of tax positions are probable or more likely than not sustained upon audit based upon the technical merits of the tax position. For tax positions that are determined to be more likely than not sustained upon audit, a company recognizes the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement in the financial statements. For tax positions that are not determined to be more likely than not sustained upon audit, a company does not recognize any portion of the benefit in the financial statements. Additionally, the Company monitors and adjusts for derecognition, classification, and penalties and interest in interim periods, with appropriate disclosure and transition thereto. Also, the amount of interest expense and income related to uncertain tax positions is computed by applying the applicable statutory rate of interest to the difference between the tax position recognized, including timing differences, and the amount previously taken or expected to be taken in a tax return. The Company recognizes interest and/or penalties related to income tax matters in income tax expense. Finally, when applicable, the Company nets its liability for unrecognized tax benefits against deferred tax assets related to net operating losses or other tax credit carryforwards that would apply if the uncertain tax position were settled for the presumed amount at the balance sheet date.

Pursuant to the Tax Cuts and Jobs Act ("U.S. Tax Reform"), specifically the one-time tax on deemed repatriation (the "Transition Tax"), the Company has provided for U.S. income tax on its undistributed earnings of non-U.S. subsidiaries, however, the Company is subject to and will incur other taxes, such as withholding taxes and dividend distribution taxes, if these undistributed earnings were ultimately remitted to the U.S. The Company currently intends to reinvest its future undistributed earnings of non-U.S. subsidiaries to support working capital needs and certain other growth initiatives of those subsidiaries. However, in certain cases the Company has and may in the future change its indefinite reinvestment assertion for any or all of these undistributed earnings. In this case, the Company would estimate and record a tax liability and corresponding tax expense for the amount of non-U.S. income taxes it would incur to ultimately remit these earnings to the U.S. See Note 10 of Notes to Consolidated Financial Statements.

Derivatives: The Company is exposed to the impact of changes in interest rates, foreign currency fluctuations, changes in commodity prices and credit risk. The Company utilizes interest rate swap agreements to enhance its ability to manage risk, including exposure to variability in interest payments associated with its variable rate debt. Derivative instruments are entered into for periods consistent with the related underlying exposures and do not constitute positions independent of those exposures. As of December 31, 2020 and 2019, the Company had certain interest rate swap agreements that were designated as cash flow hedges. Interest rate swaps are entered into with a limited number of counterparties, each of which allows for net settlement of all contracts through a single payment in a single currency in the event of a default on or termination of any one contract. The Company records these instruments on a net basis within the Consolidated Balance Sheets. The effective portion of the change in fair value of the agreement is recorded in AOCI and will be recognized in the Consolidated Statements of Income when the hedge item affects earnings or losses or it becomes probable that the forecasted transaction will not occur. See Note 25 of Notes to Consolidated Financial Statements.

Fair value measurements: The Company utilizes the FASB's guidance regarding fair value measurements, which establishes a common definition for fair value to be applied to guidance requiring use of fair value, establishes a framework for measuring fair value and expands disclosure about such fair value measurements. Specifically, the guidance utilizes a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value into three broad levels. See Notes 21 and 24 of Notes to Consolidated Financial Statements. The following is a brief description of those three levels:

- Level 1: Observable inputs such as quoted prices (unadjusted) in active markets for identical assets or liabilities.
- Level 2: Inputs other than quoted prices that are observable for the asset or liability, either directly or indirectly. These include quoted prices for similar assets or liabilities in active markets and quoted prices for identical or similar assets or liabilities in markets that are not active.
- Level 3: Unobservable inputs that reflect the reporting entity's own assumptions.

Share-based compensation: The Company applies the FASB's guidance regarding share-based payments, which requires the recognition of the fair value of share-based compensation as a component of expense. The Company has a long-term incentive program ("LTIP") for key employees which provides for the granting of options to purchase stock at prices not less than its market value on the date of the grant. Most options become exercisable within three years after the date of the grant for a period of time determined by the Company, but not to exceed seven years from the date of grant. Restricted stock awards and restricted stock units issued under the LTIP program are subject to time vesting generally over a one to three-year period. In addition, as part of the Company's Annual Incentive Plan, nonvested shares may be issued to key employees, which generally would vest over a two to five-year period.

In addition, while the FASB's guidance permits the Company to make an accounting policy election to account for forfeitures as they occur for service condition aspects of certain share-based awards, the Company has decided not to elect this accounting policy and instead has elected to continue utilizing a forfeiture rate assumption. Based on historical experience, the Company has assumed a forfeiture rate of 13% on certain of its nonvested stock awards. The Company will record additional expense if the actual forfeiture rate is lower than estimated and will record a recovery of prior expense if the actual forfeiture is higher than estimated.

The Company also issues performance-dependent stock awards as a component of its LTIP. The fair value of the performance-dependent stock awards is based on their grant-date market value adjusted for the likelihood of attaining certain pre-determined performance goals and is calculated by utilizing a Monte Carlo Simulation model. Compensation expense is recognized on a straight-line basis over the vesting period, generally three years.

See Note 8 of the Notes to Consolidated Financial Statements.

Earnings per share: The Company follows the FASB's guidance regarding the calculation of earnings per share for nonvested stock awards with rights to non-forfeitable dividends. The guidance requires nonvested stock awards with rights to non-forfeitable dividends to be included as part of the basic weighted average share calculation under the two-class method. See Note 11 of Notes to Consolidated Financial Statements.

Segments: The Company's reportable segments reflect the structure of the Company's internal organization, the method by which the Company's resources are allocated and the manner by which the Company and the chief operating decision maker assess its performance . See Note 4 of Notes to Consolidated Financial Statements.

Hyper-inflationary accounting: Economies that have a cumulative three-year rate of inflation exceeding 100% are considered hyper-inflationary in accordance with U.S. GAAP. A legal entity that operates within an economy deemed to be hyper-inflationary is required to remeasure its monetary assets and liabilities to the applicable published exchange rates and record the associated gains or losses resulting from the remeasurement directly to the Consolidated Statements of Income.

Venezuela's economy has been considered hyper-inflationary under U.S. GAAP since 2010. The Company has a 50% equity interest in a Venezuelan affiliate, Kelko Quaker Chemical, S.A ("Kelko Venezuela"). Due to heightened foreign exchange controls and restrictions currently present within Venezuela, during the third quarter of 2018 the Company concluded that it no longer had significant influence over this affiliate. Prior to this determination, the Company historically accounted for this affiliate under the equity method. As of December 31, 2020 and 2019, the Company had no remaining carrying value for its investment in Kelko Venezuela. See Note 17 of Notes to Consolidated Financial Statements.

Based on various indices or index compilations currently being used to monitor inflation in Argentina as well as recent economic instability, effective July 1, 2018, Argentina's economy was considered hyper-inflationary under U.S. GAAP. As a result, the Company began applying hyper-inflationary accounting with respect to the Company's wholly owned Argentine subsidiary beginning July 1, 2018. In addition, Houghton has an Argentine subsidiary to which hyper-inflationary accounting also is applied. As of, and for the year ended December 31, 2020, the Company's Argentine subsidiaries represented less than 1% of the Company's consolidated total assets and net sales, respectively. During the years ended December 31, 2020, 2019 and 2018, the Company recorded $0.4 million, $1.0 million, and $0.7 million, respectively, of remeasurement losses associated with the applicable currency conversions related to Venezuela and Argentina.

Business combinations: The Company accounts for business combinations under the acquisition method of accounting. This method requires the recording of acquired assets, including separately identifiable intangible assets and assumed liabilities at their respective acquisition date estimated fair values. Any excess of the purchase price over the estimated fair value of the identifiable net assets acquired is recorded as goodwill. The determination of the estimated fair value of assets acquired and liabilities assumed requires significant estimates and assumptions. Based on the assessment of additional information during the measurement period, which may be up to one year from the acquisition date, the Company may record adjustments to the estimated fair value of assets acquired and liabilities assumed. See Note 2 of Notes to Consolidated Financial Statements.

Restructuring activities: Restructuring programs consist of employee severance, rationalization of manufacturing or other facilities and other related items. To account for such programs, the Company applies FASB's guidance regarding exit or disposal cost obligations. This guidance requires that a liability for a cost associated with an exit or disposal activity be recognized when the liability is incurred, is estimable, and payment is probable. See Note 7 of Notes to Consolidated Financial Statements.

Reclassifications: Certain information has been reclassified to conform to the current year presentation.

Accounting estimates: The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities and disclosure of contingencies at the date of the financial statements and the reported amounts of net sales and expenses during the reporting period. Actual results could differ from such estimates.

Note 2 – Business Combinations

Houghton

On August 1, 2019, the Company completed the Combination, whereby the Company acquired all of the issued and outstanding shares of Houghton from Gulf Houghton Lubricants, Ltd. and certain other selling shareholders in exchange for a combination of cash and shares of the Company's common stock in accordance with the Share Purchase Agreement dated April 4, 2017. Houghton is a leading global provider of specialty chemicals and technical services for metalworking and other industrial applications. The Company believes that combining the Legacy Quaker and Houghton products and service offerings allows Quaker Houghton to better serve its customers in its various end markets.

The Combination was subject to certain regulatory and shareholder approvals. At a shareholder meeting held during 2017, the Company's shareholders approved the issuance of new shares of the Company's common stock at closing of the Combination. Also in 2017, the Company received regulatory approvals for the Combination from China and Australia. The Company received regulatory approvals from the European Commission ("EC") during the second quarter of 2019 and the U.S. Federal Trade Commission ("FTC") in July 2019. The approvals from the FTC and the EC required the concurrent divestiture of certain steel and aluminum related product lines of Houghton, which were sold by Houghton on August 1, 2019 for approximately $37 million in cash. The final remedy agreed with the EC and the FTC was consistent with the Company's previous expectation that the total divested product lines would be approximately 3% of the combined company's net sales.

The following table summarizes the fair value of consideration transferred in the Combination:

Cash transferred to Houghton shareholders (a)	$ 170,829
Cash paid to extinguish Houghton debt obligations	702,556
Fair value of common stock issued as consideration (b)	789,080
Total fair value of consideration transferred	$ 1,662,465

(a) A portion is held in escrow by a third party, subject to indemnification rights that lapse upon the achievement of certain milestones.

(b) Amount was determined based on approximately 4.3 million shares, comprising 24.5% of the common stock of the Company immediately after the closing, and the closing price per share of Quaker Chemical Corporation common stock of $182.27 on August 1, 2019.

The Company accounted for the Combination under the acquisition method of accounting. This method requires the recording of acquired assets, including separately identifiable intangible assets, at their fair value on the acquisition date. Any excess of the purchase price over the estimated fair value of the identifiable net assets acquired is recorded as goodwill. The determination of the estimated fair value of assets acquired, including indefinite and definite-lived intangible assets, requires management's judgment and often involves the use of significant estimates and assumptions, including assumptions with respect to future cash inflows and outflows, discount rates, customer attrition rates, royalty rates, asset lives and market multiples, among other items. Fair values were determined by management using a variety of methodologies and resources, including external independent valuation experts. The valuation methods included physical appraisals, discounted cash flow analyses, excess earnings, relief from royalty, and other appropriate valuation techniques to determine the fair value of assets acquired and liabilities assumed.

The following table presents the final estimated fair values of Houghton net assets acquired:

	August 1, 2019 (1)	**Measurement Period Adjustments**	**August 1, 2019 (as adjusted)**
Cash and cash equivalents	$ 75,821	$ —	$ 75,821
Accounts receivable	178,922	—	178,922
Inventories	95,193	—	95,193
Prepaid expenses and other assets	10,652	666	11,318
Property, plant and equipment	115,529	(66)	115,463
Right of use lease assets	10,673	—	10,673
Investments in associated companies	66,447	—	66,447
Other non-current assets	4,710	1,553	6,263
Intangible assets	1,028,400	—	1,028,400
Goodwill	494,915	4,625	499,540
Total assets purchased	2,081,262	6,778	2,088,040
Short-term borrowings, not refinanced at closing	9,297	—	9,297
Accounts payable, accrued expenses and other accrued liabilities	150,078	1,127	151,205
Deferred tax liabilities	205,082	4,098	209,180
Long-term lease liabilities	6,607	—	6,607
Other non-current liabilities	47,733	1,553	49,286
Total liabilities assumed	418,797	6,778	425,575
Total consideration paid for Houghton	1,662,465	—	1,662,465
Less: cash acquired	75,821	—	75,821
Less: fair value of common stock issued as consideration	789,080	—	789,080
Net cash paid for Houghton	$ 797,564	$ —	$ 797,564

(1) As previously disclosed in the Company's 2019 Form 10-K.

During 2020, the allocation of the purchase price for the Combination was finalized and the one-year measurement period has ended. Houghton assets acquired and liabilities assumed were assigned to each of the Company's reportable segments on a specific identification or allocated basis, as applicable. Prior to finalizing the purchase price allocation, certain measurement period adjustments were recorded during 2020 related primarily to increasing the valuation allowances against the deferred tax assets associated with foreign tax credits acquired as part of the Combination as additional information became available and was used to update the Company's initial estimates of expenses allocated to foreign source income and expected creditable foreign taxes. In addition, measurement period adjustments included the recognition of additional other non-current assets and other non-current liabilities based on additional information obtained regarding certain tax audits and associated rights to indemnification, and certain non-income tax liabilities payable upon closing of the Combination in certain countries.

The Company allocated $1,028.4 million of the purchase price to intangible assets, including certain measurement period adjustments, comprised of $242.0 million of trademarks and tradename, to which management has assigned indefinite lives; $677.3 million of customer relationships, to be amortized over 15 to 18 years; and $109.1 million of existing product technology, to be amortized over 20 years. In addition, the Company recorded $499.5 million of goodwill, including measurement period adjustments, related to expected value not allocated to other acquired assets, none of which will be tax deductible. See Note 16 of Notes to Consolidated Financial Statements. Factors contributing to the purchase price that resulted in goodwill included the acquisition of management, business processes and personnel that will allow Quaker Houghton to better serve its customers. The expanded portfolio is expected to generate significant cross-selling opportunities and allow further expansion into certain emerging growth markets.

Commencing August 1, 2019, the Company's Consolidated Statements of Income included the results of Houghton. Net sales of Houghton subsequent to closing of the Combination and included in the Company's Consolidated Statements of Income for the year ended December 31, 2019 were $299.8 million. The following unaudited pro forma consolidated financial information has been prepared as if the Combination had taken place on January 1, 2018. The unaudited pro forma results include certain adjustments to each company's historical actual results, including: (i) additional depreciation and amortization expense based on the initial estimates of fair value step up and estimated useful lives of depreciable fixed assets, definite-lived intangible assets and investment in associated companies acquired; (ii) adoption of required accounting guidance and alignment of related accounting policies, (iii) elimination of transactions between Legacy Quaker and Houghton; (iv) elimination of results associated with the divested product lines; (v) adjustment to interest expense, net, to reflect the impact of the financing and capital structure of the combined Company; and (vi) adjustment for certain Combination, integration and other acquisition-related costs to reflect such costs as if they were incurred in the period immediately following the pro-forma closing of the Combination on January 1, 2018. The adjustments described in (vi) include an expense recorded in costs of goods sold ("COGS") associated with selling inventory acquired in the Combination which was adjusted to fair value as part of purchase accounting, restructuring expense incurred associated with the Company's global restructuring program initiated post-closing of the Combination and certain other integration costs incurred post-closing included in combination and other acquisition-related expenses. These costs have been presented in the unaudited pro forma table below as these costs on a pro forma basis were incurred during the year ended December 31, 2018. Unaudited pro forma results are not necessarily indicative of the results that would have occurred if the acquisition had occurred on the date indicated, or that may result in the future for various reasons, including the potential impact of revenue and cost synergies on the business.

Unaudited Pro Forma *(as if the Combination occurred on January 1, 2018)*	**For the years ending December 31,** **2019**	**2018**
Net sales	$ 1,562,427	$ 1,654,588
Net income attributable to Quaker Chemical Corporation	94,537	35,337

Combination, integration and other acquisition-related expenses have been and are expected to continue to be significant. The Company incurred total costs of $30.3 million, $38.0 million and $19.5 million for the years ended December 31, 2020, 2019 and 2018 related to the Combination, integration and other acquisition-related activities. These costs included certain legal, financial and other advisory and consultant costs related to due diligence, regulatory approvals and closing the Combination, as well as integration planning and post-closing integration activities including internal control readiness and remediation. These costs also include interest costs to maintain the bank commitment ("ticking fees") for the Combination during each of the years ended December 31, 2019 and 2018, accelerated depreciation charges during the years ended December 31, 2020 and 2019, a loss on the sale of a held-for-sale asset during the year ended December 31, 2020, and a gain on the sale of a held-for-sale asset during the year ended December 31, 2018. As of December 31, 2020 and 2019, the Company had current liabilities related to the Combination and other acquisition-related activities of $7.5 million and $6.6 million, respectively, primarily recorded within other accrued liabilities on its Consolidated Balance Sheets.

Norman Hay

In October 2019, the Company completed its acquisition of the operating divisions of Norman Hay plc ("Norman Hay"), a private U.K. company that provides specialty chemicals, operating equipment, and services to industrial end markets. The acquisition adds new technologies in automotive, original equipment manufacturer ("OEM"), and aerospace, as well as engineering expertise which is expected to strengthen the Company's existing equipment solutions platform. The acquired Norman Hay assets and liabilities were assigned to the Global Specialty Businesses reportable segment. The original purchase price was 80.0 million GBP, on a cash-free and debt-free basis, subject to routine and customary post-closing adjustments related to working capital and net indebtedness levels.

The following table presents the final estimated fair values of Norman Hay net assets acquired:

	October 1, 2019 (1)	Measurement Period Adjustments	October 1, 2019 (as adjusted)
Cash and cash equivalents	$ 18,981	$ —	$ 18,981
Accounts receivable	15,471	—	15,471
Inventories	8,213	(49)	8,164
Prepaid expenses and other assets	4,203	138	4,341
Property, plant and equipment	14,981	—	14,981
Right of use lease assets	10,608	—	10,608
Intangible assets	51,088	—	51,088
Goodwill	29,384	(82)	29,302
Total assets purchased	152,929	7	152,936
Long-term debt included current portions	485	—	485
Accounts payable, accrued expenses and other accrued liabilities	13,488	(732)	12,756
Deferred tax liabilities	12,746	905	13,651
Long-term lease liabilities	8,594	—	8,594
Total liabilities assumed	35,313	173	35,486
Total consideration paid for Norman Hay	117,616	(166)	117,450
Less: estimated purchase price settlement (2)	3,287	(3,287)	—
Less: cash acquired	18,981	—	18,981
Net cash paid for Norman Hay	$ 95,348	$ 3,121	$ 98,469

(1) As previously disclosed in the Company's 2019 Form 10-K.
(2) The Company finalized its post-closing adjustments for the Norman Hay acquisition and paid approximately 2.5 million GBP during the first quarter of 2020 to settle such adjustments.

During 2020, the allocation of the purchase price for Norman Hay was finalized and the one-year measurement period has ended. The Company allocated $51.1 million of the purchase price to intangible assets, comprised of $36.9 million of customer relationships, to be amortized over 13 to 17 years; $7.5 million of existing product technology, to be amortized over 20 years; $6.3 million of trademarks, to be amortized over 16 to 17 years; and $0.4 million of non-compete agreements, to be amortized over 2 to 11 years. In addition, the Company recorded $29.3 million of goodwill related to expected value not allocated to other acquired assets, none of which will be tax deductible. Factors contributing to the purchase price that resulted in goodwill included the acquisition of management, business processes and personnel that will allow Quaker Houghton to better serve its customers.

The results of operations of Norman Hay are included in the Consolidated Statements of Income as of October 1, 2019. Transaction expenses associated with this acquisition are included in Combination, integration and other acquisition-related expenses in the Company's Consolidated Statements of Income. Certain pro forma and other information is not presented, as the operations of Norman Hay are not considered material to the overall operations of the Company for the periods presented.

Coral Chemical Company

In December 2020, the Company completed its acquisition of Coral Chemical Company ("Coral"), a privately held, U.S.-based provider of metal finishing fluid solutions. The acquisition provides technical expertise and product solutions for pre-treatment, metalworking and wastewater treatment applications to the beverage cans and general industrial end markets. The acquired Coral assets and liabilities were assigned to the Americas and Global Specialty Businesses reportable segments. The original purchase price was approximately $54.1 million, subject to routine and customary post-closing adjustments related to working capital and net indebtedness levels.

The following table presents the preliminary estimated fair values of Coral net assets acquired:

	December 22, 2020
Cash and cash equivalents	$ 958
Accounts receivable	8,473
Inventories	4,527
Prepaid expenses and other assets	181
Property, plant and equipment	10,467
Intangible assets	30,300
Goodwill	2,814
Total assets purchased	57,720
Long-term debt included current portions	183
Accounts payable, accrued expenses and other accrued liabilities	3,482
Total liabilities assumed	3,665
Total consideration paid for Coral	54,055
Less: cash acquired	958
Net cash paid for Coral	$ 53,097

The Company allocated $30.3 million of the purchase price to intangible assets, comprised of $22.0 million of customer relationships, to be amortized over 21 to 24 years; $4.7 million of existing product technology, to be amortized over 14 to 15 years; $3.6 million of trademarks, to be amortized over 17 years. In addition, the Company recorded $2.8 million of goodwill related to expected value not allocated to other acquired assets, none of which will be tax deductible. Factors contributing to the purchase price that resulted in goodwill included the acquisition of management, business processes and personnel that will allow Quaker Houghton to better serve its customers.

As of December 31, 2020, the allocation of the purchase price for Coral has not been finalized and the one-year measurement period has not ended. Further adjustments may be necessary as a result of the Company's on-going assessment of additional information related to the fair value of assets acquired and liabilities assumed. The preliminary purchase price allocations are based upon the valuation of assets and these estimates and assumptions are subject to change as the Company obtains additional information during the measurement period. These assets pending finalization include fixed assets and intangible assets which could also result in adjustments to goodwill.

The results of operations of Coral subsequent to the acquisition date are included in the Consolidated Statements of Income as of December 31, 2020. Transaction expenses associated with this acquisition are included in Combination, integration and other acquisition-related expenses in the Company's Consolidated Statements of Income. Certain pro forma and other information is not presented, as the operations of Coral are not considered material to the overall operations of the Company for the periods presented.

Other Acquisitions

In February 2021, the Company acquired certain assets related to tin-plating solutions in the steel end market for approximately $25 million. The results of operations of the acquired assets are not included in the Consolidated Statements of Income, because the date of closing was after December 31, 2020. Transaction expenses associated with this acquisition that were incurred during the year ended December 31, 2020 are included in Combination, integration and other acquisition-related expenses in the Company's Consolidated Statements of Income. A preliminary purchase price allocation of assets acquired and liabilities assumed has not been presented as that information is not available as of the date of these Consolidated Financial Statements.

In May 2020, the Company acquired Tel Nordic ApS ("TEL"), a company that specializes in lubricants and engineering primarily in high pressure aluminum die casting for its Europe, Middle East and Africa ("EMEA") reportable segment. Consideration paid was in the form of a convertible promissory note in the amount of 20.0 million DKK, or approximately $2.9 million, which was subsequently converted into shares of the Company's common stock. An adjustment to the purchase price of approximately 0.4 million DKK, or less than $0.1 million, was made as a result of finalizing a post-closing settlement in the second quarter of 2020. The Company allocated approximately $2.4 million of the purchase price to intangible assets to be amortized over 17 years. In addition, the Company recorded approximately $0.5 million of goodwill, related to expected value not allocated to other acquired assets, none of which will be tax deductible. The allocation of the purchase price of TEL has not been finalized and the one-year measurement period has not ended. Further adjustments may be necessary as a result of the Company's on-going assessment of additional information related to the fair value of assets acquired and liabilities assumed.

In March 2020, the Company acquired the remaining 49% ownership interest in one of its South African affiliates, Quaker Chemical South Africa Limited ("QSA") for 16.7 million ZAR, or approximately $1.0 million, from its joint venture partner PQ Holdings South Africa. QSA is a part of the Company's EMEA reportable segment. As this acquisition was a change in an existing controlling ownership, the Company recorded $0.7 million of excess purchase price over the carrying value of the noncontrolling interest in Capital in excess of par value.

In March 2018, the Company purchased certain formulations and product technology for the mining industry for $1.0 million. The Company allocated the entire purchase price to intangible assets representing formulations and product technology, to be amortized over 10 years. In accordance with the terms of the applicable purchase agreement, $0.5 million of the purchase price was paid at signing, and the remaining $0.5 million of the purchase price was paid during the first quarter of 2019.

Note 3 – Recently Issued Accounting Standards

Recently Issued Accounting Standards Adopted

The FASB issued Account Standards Update ("ASU") 2020-04, *Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting* in March 2020. The amendments provide temporary optional expedients and exceptions for applying GAAP to contract modifications, hedging relationships and other transactions to ease the potential accounting and financial reporting burden associated with transitioning away from reference rates that are expected to be discontinued, including the London Interbank Offered Rate ("LIBOR"). ASU 2020-04 is effective for the Company as of March 12, 2020 and generally can be applied through December 31, 2022. As of December 31, 2020, the expedients provided in ASU 2020-04 do not impact the Company; however, the Company will continue to monitor for potential impacts on its consolidated financial statements.

The FASB issued ASU 2018-15, *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* in August 2018 that clarifies the accounting for implementation costs incurred in a cloud computing arrangement under a service contract. This guidance generally aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement under a service contract with the requirements for capitalizing implementation costs related to internal-use software. The guidance within this accounting standard update is effective for annual periods beginning after December 15, 2019 and should be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. Early adoption was permitted. The Company adopted this standard on a prospective basis, effective January 1, 2020. There was no cumulative effect of adoption recorded within retained earnings on January 1, 2020.

The FASB issued ASU 2018-14, *Disclosure Framework — Changes to the Disclosure Requirements for Defined Benefit Plans* in August 2018 that modifies certain disclosure requirements for fair value measurements. The guidance removes certain disclosure requirements regarding transfers between levels of the fair value hierarchy as well as certain disclosures related to the valuation processes for certain fair value measurements. Further, the guidance added certain disclosure requirements including unrealized gains and losses and significant unobservable inputs used to develop certain fair value measurements. The guidance within this accounting standard update is effective for annual and interim periods beginning after December 15, 2019, and should be applied prospectively in the initial year of adoption or prospectively to all periods presented, depending on the amended disclosure requirement. Early adoption was permitted. The Company adopted this standard on a prospective basis, effective January 1, 2020. ASU 2018-14 addresses disclosures only and will not have an impact on the Company's consolidated financial statements.

The FASB issued ASU 2018-13, Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement in August 2018 that modifies certain disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The amendments in this ASU remove disclosures that are no longer considered cost beneficial, clarify the specific requirements of certain disclosures, and add new disclosure requirements as relevant. The guidance within this accounting standard update is effective for annual periods beginning after December 15, 2019, and should be applied retrospectively to all periods presented. The Company adopted this standard on a prospective basis, effective January 1, 2020. There was no cumulative effect of adoption recorded within retained earnings on January 1, 2020.

The FASB issued ASU 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* in June 2016 related to the accounting for and disclosure of credit losses. The FASB subsequently issued several additional accounting standard updates which amended and clarified the guidance, but did not materially change the guidance or its applicability to the Company. This accounting guidance introduces a new model for recognizing credit losses on financial instruments, including customer accounts receivable, based on an estimate of current expected credit losses. The Company adopted the guidance in this accounting standard update, including all applicable subsequent updates to this accounting guidance, as required, on a modified retrospective basis, effective January 1, 2020. Adoption did not have a material impact to the Company's financial statements as expected. However, as a result of this adoption, the Company recorded a cumulative effect of accounting change that resulted in an increase to its allowance for doubtful accounts of approximately $1.1 million, a decrease to deferred tax liabilities of $0.2 million and a decrease to retained earnings of $0.9 million.

In accordance with this guidance, the Company recognizes an allowance for credit losses reflecting the net amount expected to be collected from its financial assets, primarily trade accounts receivable. This allowance represents the portion of the receivable that the Company does not expect to collect over its contractual life, considering past events and reasonable and supportable forecasts of future economic conditions. The Company's allowance for credit losses on its trade accounts receivable is based on specific collectability facts and circumstances for each outstanding receivable and customer, the aging of outstanding receivables and the associated collection risk the Company estimates for certain past due aging categories, and also, the general risk to all outstanding accounts receivable based on historical amounts determined to be uncollectible. See Note 13 of Notes to the Consolidated Financial Statements.

Recently Issued Accounting Standards Not Yet Adopted

The FASB issued ASU 2020-01, *Investments – Equity Securities (Topic 321), Investments – Equity Method and Joint Ventures (Topic 323), and Derivatives and Hedging (Topic 815) –Clarifying the Interactions between Topic 321, Topic 323, and Topic 815* in January 2020 clarifying the interaction among the accounting standards related to equity securities, equity method investments, and certain derivatives. The new guidance, among other things, states that a company should consider observable transactions that require a company to either apply or discontinue the equity method of accounting, for the purposes of applying the fair value measurement alternative immediately before applying or upon discontinuing the equity method. The new guidance also addresses the measurement of certain purchased options and forward contracts used to acquire investments. The guidance within this accounting standard update is effective for annual and interim periods beginning after December 15, 2020 and is to be applied prospectively. Early adoption is permitted. The Company will adopt this standard, as required, on a prospective basis, effective January 1, 2021, and does not expect adoption to have an impact to its financial statements.

The FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* in December 2019. The guidance within this accounting standard update removes certain exceptions, including the exception to the incremental approach for certain intra-period tax allocations, to the requirement to recognize or not recognize certain deferred tax liabilities for equity method investments and foreign subsidiaries, and to the general methodology for calculating income taxes in an interim period when a year-to-date loss exceeds the anticipated loss for the year. Further, the guidance simplifies the accounting related to franchise taxes, the step up in tax basis for goodwill, current and deferred tax expense, and codification improvements for income taxes related to employee stock ownership plans. The guidance is effective for annual and interim periods beginning after December 15, 2020. Early adoption is permitted. The Company will adopt this standard, as required, effective January 1, 2021, and is currently evaluating its implementation and any potential adoption impact.

Note 4 – Business Segments

The Company's operating segments, which are consistent with its reportable segments, reflect the structure of the Company's internal organization, the method by which the Company's resources are allocated and the manner by which the chief operating decision maker assess the Company's performance. During the third quarter of 2019 and in connection with the Combination, the Company reorganized its executive management team to align with its new business structure, which reflects the method by which the chief operating decision maker assesses the Company's performance and allocates its resources. The Company's current reportable segment structure includes four segments: (i) Americas; (ii) EMEA; (iii) Asia/Pacific; and (iv) Global Specialty Businesses. The three geographic segments are composed of the net sales and operations in each respective region, excluding net sales and operations managed globally by the Global Specialty Businesses segment, which includes the Company's container, metal finishing, mining, offshore, specialty coatings, specialty grease and Norman Hay businesses.

Although the Company changed its reportable segments in the third quarter of 2019, the calculation of the reportable segments' measures of earnings remains otherwise generally consistent with past practices. Segment operating earnings for each of the Company's reportable segments are comprised of the segment's net sales less directly related COGS and SG&A. Operating expenses not directly attributable to the net sales of each respective segment, such as certain corporate and administrative costs, Combination, integration and other acquisition-related expenses, and Restructuring and related charges, are not included in segment operating earnings. Other items not specifically identified with the Company's reportable segments include interest expense, net and other expense, net.

The following tables present information about the performance of the Company's reportable segments for the years ended December 31, 2020, 2019 and 2018. Certain immaterial reclassifications within the segment disclosures for the years ended December 31, 2019 and 2018 have been made to conform with the Company's current customer industry segmentation.

	2020	2019	2018
Net sales			
Americas	$ 450,161	$ 392,121	$ 297,601
EMEA	383,187	285,570	216,984
Asia/Pacific	315,299	247,839	192,502
Global Specialty Businesses	269,030	207,973	160,433
Total net sales	$ 1,417,677	$ 1,133,503	$ 867,520

	2020	2019	2018
Segment operating earnings			
Americas	$ 96,379	$ 78,297	$ 62,686
EMEA	69,163	47,014	36,119
Asia/Pacific	88,356	67,512	53,739
Global Specialty Businesses	79,690	58,881	42,931
Total segment operating earnings	333,588	251,704	195,475
Combination, integration and other acquisition-related expenses	(29,790)	(35,477)	(16,661)
Restructuring and related charges	(5,541)	(26,678)	—
Fair value step up of inventory sold	(226)	(11,714)	—
Indefinite-lived intangible asset impairment	(38,000)	—	—
Non-operating and administrative expenses	(143,202)	(104,572)	(83,515)
Depreciation of corporate assets and amortization	(57,469)	(27,129)	(7,518)
Operating income	59,360	46,134	87,781
Other expense, net	(5,618)	(254)	(642)
Interest expense, net	(26,603)	(16,976)	(4,041)
Income before taxes and equity in net income of			
associated companies	$ 27,139	$ 28,904	$ 83,098

The following tables present information regarding the Company's reportable segments' assets and long-lived assets, including certain identifiable assets as well as an allocation of shared assets, of December 31, 2020, 2019 and 2018:

	2020	2019	2018
Segment assets			
Americas	$ 969,551	$ 926,122	$ 180,037
EMEA	697,821	688,663	149,984
Asia/Pacific	713,004	685,476	205,424
Global Specialty Businesses	511,458	550,055	174,220
Total segment assets	$ 2,891,834	$ 2,850,316	$ 709,665

	2020	2019	2018
Segment long-lived assets			
Americas	$ 122,302	$ 139,170	$ 60,745
EMEA	69,344	56,108	23,383
Asia/Pacific	119,233	126,166	26,217
Global Specialty Businesses	59,091	69,184	26,949
Total segment long-lived assets	$ 369,970	$ 390,628	$ 137,294

The following tables present information regarding the Company's reportable segments' capital expenditures and depreciation for identifiable assets for the years ended December 31, 2020, 2019 and 2018:

	2020	2019	2018
Capital expenditures			
Americas	$ 6,451	$ 6,404	$ 3,401
EMEA	3,844	3,263	2,081
Asia/Pacific	5,688	3,857	6,059
Global Specialty Businesses	1,918	2,021	1,345
Total segment capital expenditures	$ 17,901	$ 15,545	$ 12,886

	2020	2019	2018
Depreciation			
Americas	$ 12,322	$ 7,500	$ 4,225
EMEA	6,813	4,560	3,434
Asia/Pacific	4,672	3,458	2,552
Global Specialty Businesses	3,544	2,248	1,985
Total segment depreciation	$ 27,351	$ 17,766	$ 12,196

During the years ended December 31, 2020, 2019 and 2018, the Company had approximately $963.2 million, $719.8 million and $534.6 million of net sales, respectively, attributable to non-U.S. operations. As of December 31, 2020, 2019 and 2018, the Company had approximately $176.6 million, $174.4 million and $60.8 million of long-lived assets, respectively, attributable to non-U.S. operations.

Inter-segment revenue for the years ended December 31, 2020, 2019 and 2018 was $9.1 million, $7.3 million and $8.3 million for Americas, $22.0 million, $20.3 million and $21.9 million for EMEA, $0.6 million, $0.2 million and $0.5 million for Asia/Pacific and $4.7 million, $5.4 million and $5.3 million for Global Specialty Businesses, respectively. However, all inter-segment transactions have been eliminated from each reportable operating segment's net sales and earnings for all periods presented in the above tables.

Note 5 – Net Sales and Revenue Recognition

Business Description

The Company develops, produces, and markets a broad range of formulated chemical specialty products and offers chemical management services ("Fluidcare") for various heavy industrial and manufacturing applications throughout its four segments. The Combination increased the Company's addressable metalworking, metals and industrial end markets, including steel, aluminum, aerospace, defense, transportation-OEM, transportation-components, offshore sub-sea energy, architectural aluminum, construction, tube and pipe, can and container, mining, specialty coatings and specialty greases. The Combination also strengthened the product portfolio of the combined Company. The major product lines of Quaker Houghton include metal removal fluids, cleaning fluids, corrosion inhibitors, metal drawing and forming fluids, die cast mold releases, heat treatment and quenchants, metal forging fluids, hydraulic fluids, specialty greases, offshore sub-sea energy control fluids, rolling lubricants, rod and wire drawing fluids and surface treatment chemicals.

A substantial portion of the Company's sales worldwide are made directly through its own employees and its Fluidcare programs, with the balance being handled through distributors and agents. The Company's employees typically visit the plants of customers regularly, work on site, and, through training and experience, identify production needs, which can be resolved or otherwise addressed either by adapting the Company's existing products or by applying new formulations developed in its laboratories. The specialty chemical industry comprises many companies similar in size to the Company, as well as companies larger and smaller than Quaker Houghton. The offerings of many of the Company's competitors differ from those of Quaker Houghton; some offer a broad portfolio of fluids, including general lubricants, while others have a more specialized product range. All competitors provide different levels of technical services to individual customers. Competition in the industry is based primarily on the ability to provide products that meet the needs of the customer, render technical services and laboratory assistance to the customer and, to a lesser extent, on price.

As part of the Company's Fluidcare business, certain third-party product sales to customers are managed by the Company. Where the Company acts as a principal, revenues are recognized on a gross reporting basis at the selling price negotiated with its customers. Where the Company acts as an agent, revenue is recognized on a net reporting basis at the amount of the administrative fee earned by the Company for ordering the goods. In determining whether the Company is acting as a principal or an agent in each arrangement, the Company considers whether it is primarily responsible for the obligation to provide the specified good, has inventory risk before the specified good has been transferred to the customer and has discretion in establishing the prices for the specified goods. The Company transferred third-party products under arrangements resulting in net reporting of $42.5 million, $48.0 million and $47.1 million for the years ended December 31, 2020, 2019 and 2018, respectively.

A significant portion of the Company's revenues are realized from the sale of process fluids and services to manufacturers of steel, aluminum, automobiles, aircraft, industrial equipment, and durable goods, and, therefore, the Company is subject to the same business cycles as those experienced by these manufacturers and their customers. The Company's financial performance is generally correlated to the volume of global production within the industries it serves, rather than discretely related to the financial performance of such industries. Furthermore, steel and aluminum customers typically have limited manufacturing locations compared to metalworking customers and generally use higher volumes of products at a single location. During the year ended December 31, 2020, the Company's five largest customers (each composed of multiple subsidiaries or divisions with semiautonomous purchasing authority) accounted for approximately 10% of consolidated net sales, with its largest customer accounting for approximately 3% of consolidated net sales.

Revenue Recognition Model

The Company applies the FASB's guidance on revenue recognition which requires the Company to recognize revenue in an amount that reflects the consideration to which the Company expects to be entitled in exchange for goods or services transferred to its customers. To do this, the Company applies the five-step model in the FASB's guidance, which requires the Company to: (i) identify the contract with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when, or as, the Company satisfies a performance obligation.

The Company identifies a contract with a customer when a sales agreement indicates approval and commitment of the parties; identifies the rights of the parties; identifies the payment terms; has commercial substance; and it is probable that the Company will collect the consideration to which it will be entitled in exchange for the goods or services that will be transferred to the customer. In most instances, the Company's contract with a customer is the customer's purchase order. For certain customers, the Company may also enter into a sales agreement which outlines a framework of terms and conditions which apply to all future and subsequent purchase orders for that customer. In these situations, the Company's contract with the customer is both the sales agreement as well as the specific customer purchase order. Because the Company's contract with a customer is typically for a single transaction or customer purchase order, the duration of the contract is almost always one year or less. As a result, the Company has elected to apply certain practical expedients and omit certain disclosures of remaining performance obligations for contracts that have an initial term of one year or less as permitted by the FASB.

The Company identifies a performance obligation in a contract for each promised good or service that is separately identifiable from other obligations in the contract and for which the customer can benefit from the good or service either on its own or together with other resources that are readily available to the customer. The Company determines the transaction price as the amount of consideration it expects to be entitled to in exchange for fulfilling the performance obligations, including the effects of any variable consideration, significant financing elements, amounts payable to the customer or noncash consideration. For any contracts that have more than one performance obligation, the Company allocates the transaction price to each performance obligation in an amount that depicts the amount of consideration to which the Company expects to be entitled in exchange for satisfying each performance obligation.

In accordance with the last step of the FASB's guidance, the Company recognizes revenue when, or as, it satisfies the performance obligation in a contract by transferring control of a promised good or providing the service to the customer. The Company recognizes revenue over time as the customer receives and consumes the benefits provided by the Company's performance; the Company's performance creates or enhances an asset that the customer controls as the asset is created or enhanced; or the Company's performance does not create an asset with an alternative use to the entity, and the entity has an enforceable right to payment, including a profit margin, for performance completed to date. For performance obligations not satisfied over time, the Company determines the point in time at which a customer obtains control of an asset and the Company satisfies a performance obligation by considering when the Company has a right to payment for the asset; the customer has legal title to the asset; the Company has transferred physical possession of the asset; the customer has the significant risks and rewards of ownership of the asset; or the customer has accepted the asset.

The Company typically satisfies its performance obligations and recognizes revenue at a point in time for product sales, generally when products are shipped or delivered to the customer, depending on the terms underlying each arrangement. In circumstances where the Company's products are on consignment, revenue is generally recognized upon usage or consumption by the customer. For any Fluidcare or other services provided by the Company to the customer, the Company typically satisfies its performance obligations and recognizes revenue over time, as the promised services are performed. The Company uses input methods to recognize revenue over time related to these services, including labor costs and time incurred. The Company believes that these input methods represent the most indicative measure of the Fluidcare or other service work performed by the Company.

Other Considerations

The Company does not have standard payment terms for all customers, however the Company's general payment terms require customers to pay for products or services provided after the performance obligation is satisfied. The Company does not have significant financing arrangements with its customers. The Company does not have significant amounts of variable consideration in its contracts with customers and where applicable, the Company's estimates of variable consideration are not constrained. The Company records certain third-party license fees in other income (expense), net, in its Consolidated Statement of Income, which generally include sales-based royalties in exchange for the license of intellectual property. These license fees are recognized in accordance with their agreed-upon terms and when performance obligations are satisfied, which is generally when the third party has a subsequent sale.

Practical Expedients and Accounting Policy Elections

The Company has made certain accounting policy elections and elected to use certain practical expedients as permitted by the FASB in applying the guidance on revenue recognition. The Company does not adjust the promised amount of consideration for the effects of a significant financing component as the Company expects, at contract inception, that the period between when the Company transfers a promised good or service to the customer and when the customer pays for that good or service will be one year or less. In addition, the Company expenses costs to obtain a contract as incurred when the expected period of benefit, and therefore the amortization period, is one year or less. In addition, the Company excludes from the measurement of the transaction price all taxes assessed by a governmental authority that are both imposed on and concurrent with a specific revenue-producing transaction and collected by the entity from a customer, including sales, use, value added, excise and various other taxes. Lastly, the Company has elected to account for shipping and handling activities that occur after the customer has obtained control of a good as a fulfilment cost, rather than an additional promised service.

Contract Assets and Liabilities

The Company recognizes a contract asset or receivable on its Consolidated Balance Sheet when the Company performs a service or transfers a good in advance of receiving consideration. A receivable is the Company's right to consideration that is unconditional and only the passage of time is required before payment of that consideration is due. A contract asset is the Company's right to consideration in exchange for goods or services that the Company has transferred to a customer. The Company had no material contract assets recorded on its Consolidated Balance Sheets as of December 31, 2020 and 2019.

A contract liability is recognized when the Company receives consideration, or if it has the unconditional right to receive consideration, in advance of performance. A contract liability is the Company's obligation to transfer goods or services to a customer for which the Company has received consideration, or a specified amount of consideration is due, from the customer. The Company's contract liabilities primarily represent deferred revenue recorded for customer payments received by the Company prior to the Company satisfying the associated performance obligation. The Company acquired and recorded an immaterial amount of deferred revenue as of the respective opening balance sheet dates related to the Combination and Norman Hay acquisition. Deferred revenues are presented within other accrued liabilities in the Company's Consolidated Balance Sheets. The Company had approximately $4.0 million and $2.2 million of deferred revenue as of December 31, 2020 and 2019, respectively. During the years ended December 31, 2020 and 2019, respectively, the Company satisfied all of the associated performance obligations and recognized into revenue the advance payments received and recorded as of December 31, 2020, 2019 and 2018, respectively.

Disaggregated Revenue

The Company sells its various industrial process fluids, its specialty chemicals and its technical expertise as a global product portfolio. The Company generally manages and evaluates its performance by segment first, and then by customer industry, rather than by individual product lines. Also, net sales of each of the Company's major product lines are generally spread throughout all three of the Company's geographic regions, and in most cases, approximately proportionate to the level of total sales in each region.

The following tables present disaggregated information regarding the Company's net sales, first by major product lines that represent more than 10% of the Company's consolidated net sales for any of the years ended December 31, 2020, 2019 and 2018, and followed then by a disaggregation of the Company's net sales by segment, geographic region, customer industry, and timing of revenue recognized for the years ended December 31, 2020, 2019 and 2018.

	2020	**2019**	**2018**
Metal removal fluids	23.9 %	19.9 %	15.4 %
Rolling lubricants	21.8 %	21.9 %	25.5 %
Hydraulic fluids	13.3 %	13.0 %	13.0 %

	Net sales for the year ending December 31, 2020			
	Americas	**EMEA**	**Asia/Pacific**	**Consolidated Total**
Customer Industries				
Metals	$ 163,135	$ 107,880	$ 168,096	$ 439,111
Metalworking and other	287,026	275,307	147,203	709,536
	450,161	383,187	315,299	1,148,647
Global Specialty Businesses	154,796	68,164	46,070	269,030
	$ 604,957	$ 451,351	$ 361,369	$ 1,417,677
Timing of Revenue Recognized				
Product sales at a point in time	$ 580,663	$ 434,549	$ 352,917	$ 1,368,129
Services transferred over time	24,294	16,802	8,452	49,548
	$ 604,957	$ 451,351	$ 361,369	$ 1,417,677

	Net sales for the year ending December 31, 2019			
	Americas	**EMEA**	**Asia/Pacific**	**Consolidated Total**
Customer Industries				
Metals	$ 171,784	$ 100,605	$ 141,870	$ 414,259
Metalworking and other	220,337	184,965	105,969	511,271
	392,121	285,570	247,839	925,530
Global Specialty Businesses	149,428	30,115	28,430	207,973
	$ 541,549	$ 315,685	$ 276,269	$ 1,133,503
Timing of Revenue Recognized				
Product sales at a point in time	$ 525,802	$ 310,274	$ 269,228	$ 1,105,304
Services transferred over time	15,747	5,411	7,041	28,199
	$ 541,549	$ 315,685	$ 276,269	$ 1,133,503

	Net sales for the year ending December 31, 2018			
	Americas	EMEA	Asia/Pacific	Consolidated Total
Customer Industries				
Metals	$ 164,263	$ 101,028	$ 120,627	$ 385,918
Metalworking and other	133,338	115,956	71,875	321,169
	297,601	216,984	192,502	707,087
Global Specialty Businesses	122,165	16,613	21,655	160,433
	$ 419,766	$ 233,597	$ 214,157	$ 867,520
Timing of Revenue Recognized				
Product sales at a point in time	$ 408,402	$ 233,372	$ 206,112	$ 847,886
Services transferred over time	11,364	225	8,045	19,634
	$ 419,766	$ 233,597	$ 214,157	$ 867,520

Note 6 – Leases

As previously disclosed in the Company’s 2019 Form 10-K, during 2019, the Company adopted, as required, an accounting standard update regarding the accounting and disclosure for leases which changed the manner in which it accounts for leases effective January 1, 2019. The Company determines if an arrangement is a lease at its inception. This determination generally depends on whether the arrangement conveys the right to control the use of an identified fixed asset explicitly or implicitly for a period of time in exchange for consideration. Control of an underlying asset is conveyed if the Company obtains the rights to direct the use of, and obtains substantially all of the economic benefits from the use of, the underlying asset. Lease expense for variable leases and short-term leases is recognized when the obligation is incurred.

The Company has operating leases for certain facilities, vehicles and machinery and equipment with remaining lease terms up to 11 years. In addition, the Company has certain land use leases with remaining lease terms up to 95 years. The lease term for all of the Company’s leases includes the non-cancellable period of the lease plus any additional periods covered by an option to extend the lease that the Company is reasonably certain it will exercise. Operating leases are included in right of use lease assets, other current liabilities and long-term lease liabilities on the Consolidated Balance Sheet. Right of use lease assets and liabilities are recognized at each lease’s commencement date based on the present value of its lease payments over its respective lease term. The Company uses the stated borrowing rate for a lease when readily determinable. When a stated borrowing rate is not available in a lease agreement, the Company uses its incremental borrowing rate based on information available at the lease’s commencement date to determine the present value of its lease payments. In determining the incremental borrowing rate used to present value each of its leases, the Company considers certain information including fully secured borrowing rates readily available to the Company and its subsidiaries. The Company has immaterial finance leases, which are included in PP&E, current portion of long-term debt and long-term debt on the Consolidated Balance Sheet.

Operating lease expense is recognized on a straight-line basis over the lease term. Operating lease expense for the years ended December 31, 2020 and 2019 was $14.2 million and $9.4 million, respectively. Short-term lease expense for the years ended December 31, 2020 and 2019 was $1.3 million and $1.5 million, respectively. The Company has no material variable lease costs or sublease income for the years ended December 31, 2020 and 2019.

Cash paid for operating leases during the years ended December 31, 2020 and 2019 was $14.1 million and $9.2 million, respectively. The Company recorded new right of use lease assets and associated lease liabilities of $6.9 million during the year ended December 31, 2020.

Supplemental balance sheet information related to the Company's leases is as follows:

	December 31, 2020	December 31, 2019
Right of use lease assets	$ 38,507	$ 42,905
Other accrued liabilities	10,901	11,177
Long-term lease liabilities	27,070	31,273
Total operating lease liabilities	$ 37,971	$ 42,450
Weighted average remaining lease term (years)	6.0	6.2
Weighted average discount rate	4.20%	4.21%

Maturities of operating lease liabilities as of December 31, 2020 were as follows:

	December 31, 2020
For the year ended December 31, 2021	$ 12,342
For the year ended December 31, 2022	8,395
For the year ended December 31, 2023	6,220
For the year ended December 31, 2024	4,610
For the year ended December 31, 2025	3,836
For the year ended December 31, 2026 and beyond	8,141
Total lease payments	43,544
Less: imputed interest	(5,573)
Present value of lease liabilities	$ 37,971

Note 7 – Restructuring and Related Activities

The Company's management approved a global restructuring plan (the "QH Program") as part of its plan to realize certain cost synergies associated with the Combination in the third quarter of 2019. The QH Program includes restructuring and associated severance costs to reduce total headcount by approximately 350 people globally, as well as plans for the closure of certain manufacturing and non-manufacturing facilities. The exact timing and total costs associated with the QH Program will depend on a number of factors and is subject to change; however, the Company currently expects reduction in headcount and site closures to continue to occur into 2021 under the QH Program and estimates that anticipated cost synergies realized from the QH Program will approximate one-times the restructuring costs incurred. Employee separation benefits will vary depending on local regulations within certain foreign countries and will include severance and other benefits.

All costs incurred to date relate to severance costs to reduce headcount as well as costs to close certain facilities and are recorded in restructuring and related charges in the Company's Consolidated Statements of Income. As described in Note 4 of Notes to Consolidated Financial Statements, restructuring and related charges are not included in the Company's calculation of reportable segments' measure of operating earnings and therefore these costs are not reviewed by or recorded to reportable segments.

Activity in the Company's accrual for restructuring under the QH Program for the years ended December 31, 2020 and 2019 is as follows:

	QH Program
Accrued restructuring as of December 31, 2018	$ -
Restructuring and related charges	26,678
Cash payments	(8,899)
Currency translation adjustments	264
Accrued restructuring as of December 31, 2019	18,043
Restructuring and related charges	5,541
Cash payments	(15,745)
Currency translation adjustments	409
Accrued restructuring as of December 31, 2020	$ 8,248

In connection with the plans for closure of certain manufacturing and non-manufacturing facilities, the Company made a decision to make available for sale certain facilities. During the fourth quarter of 2020, certain of these facilities were sold and the Company recognized a loss on disposal of approximately $0.6 million included within other expense, net on the Consolidated Statement of Income. Additionally, certain buildings and land with an aggregate book value of approximately $10.0 million continues to be held-for-sale as of December 31, 2020 and are recorded in other current assets on the Company's Consolidated Balance Sheet.

Note 8 – Share-Based Compensation

The Company recognized the following share-based compensation expense in its Consolidated Statements of Income for the years ended December 31, 2020, 2019 and 2018:

	2020	2019	2018
Stock options	$ 1,491	$ 1,448	$ 1,053
Non-vested stock awards and restricted stock units	5,012	3,206	2,459
Non-elective and elective 401(k) matching contribution in stock	3,112	—	—
Employee stock purchase plan	—	84	89
Director stock ownership plan	541	123	123
Performance stock units	840	—	—
Annual incentive plan (1)	—	—	—
Total share-based compensation expense	$ 10,996	$ 4,861	$ 3,724

(1) Refer to the section entitled *Annual Incentive Plan* below for additional information.

Share-based compensation expense is recorded in SG&A, except for $1.5 million, $0.9 million and $0.1 million during the years ended December 31, 2020, 2019 and 2018, respectively, recorded within Combination, integration and other acquisition-related expenses. The increase in total share-based compensation expense for the year ended December 31, 2020 includes performance stock units and non-elective and elective 401(k) matching contributions in stock as components of share-based compensation beginning in 2020, described further below.

Stock Options

Stock option activity under all plans is as follows:

	Number of Options	Weighted Average Exercise Price (per option)	Weighted Average Remaining Contractual Term (years)	Aggregate Intrinsic Value
Options outstanding as of January 1, 2020	144,412	$ 137.15		
Options granted	49,115	136.64		
Options exercised	(83,191)	128.42		
Options outstanding as of December 31, 2020	110,336	$ 143.51	5.2	$ 12,015
Options expected to vest after December 31, 2020	92,890	$ 144.86	5.6	$ 9,990
Options exercisable as of December 31, 2020	17,446	$ 136.32	3.4	$ 2,025

The total intrinsic value of options exercised during the years ended December 31, 2020, 2019 and 2018 was approximately $6.5 million, $2.5 million and $2.0 million, respectively. Intrinsic value is calculated as the difference between the current market price of the underlying security and the strike price of a related option.

A summary of the Company's outstanding stock options as of December 31, 2020 is as follows:

Range of Exercise Prices	Number of Options Outstanding	Weighted Average Remaining Contractual Term (years)	Weighted Average Exercise Price (per option)	Number of Options Exercisable	Weighted Average Exercise Price (per option)
$ 70.01 - $ 80.00	2,133	1.0	$ 72.12	2,133	$ 72.12
$ 80.01 - $ 90.00	1,309	1.0	87.30	1,309	87.30
$ 90.01 - $ 130.00	—	—	—	—	—
$ 130.01 - $ 140.00	51,732	6.0	136.54	2,617	134.60
$ 140.01 - $ 150.00	—	—	—	—	—
$ 150.01 - $ 160.00	55,162	4.8	154.14	11,387	154.37
	110,336	5.2	143.51	17,446	136.32

As of December 31, 2020, unrecognized compensation expense related to options granted in 2020, 2019 and 2018 was $1.2 million, $0.3 million and less than $0.1 million, respectively, to be recognized over a weighted average period of 1.9 years.

The Company granted stock options under its LTIP plan that are subject only to time vesting generally over a three-year period during 2020, 2019, 2018 and 2017. For the purposes of determining the fair value of stock option awards, the Company uses the Black-Scholes option pricing model and the assumptions set forth in the table below:

	2020	2019	2018	2017
Number of stock options granted	49,115	51,610	35,842	42,477
Dividend yield	0.99 %	1.12 %	1.37 %	1.49 %
Expected volatility	31.57 %	26.29 %	24.73 %	25.52 %
Risk-free interest rate	0.36 %	1.52 %	2.54 %	1.67 %
Expected term (years)	4.0	4.0	4.0	4.0

The fair value of these options is being amortized on a straight-line basis over the respective vesting period of each award. The compensation expense recorded on each award during the years ended December 31, 2020, 2019 and 2018, respectively, is as follows:

	2020	2019	2018
2020 Stock option awards	$ 385	$ —	$ —
2019 Stock option awards	698	665	—
2018 Stock option awards	357	364	310
2017 Stock option awards	51	369	367

Restricted Stock Awards

Activity of non-vested restricted stock awards granted under the Company's LTIP plan is shown below:

	Number of Shares	Weighted Average Grant Date Fair Value (per share)
Nonvested awards, December 31, 2019	64,500	$ 152.67
Granted	28,244	145.63
Vested	(19,195)	148.15
Forfeited	(1,781)	150.27
Nonvested awards, December 31, 2020	71,768	$ 151.17

The fair value of the non-vested stock is based on the trading price of the Company's common stock on the date of grant. The Company adjusts the grant date fair value for expected forfeitures based on historical experience for similar awards. As of December 31, 2020, unrecognized compensation expense related to these awards was $4.7 million, to be recognized over a weighted average remaining period of 1.6 years.

Restricted Stock Units

Activity of non-vested restricted stock units granted under the Company's LTIP plan is shown below:

	Number of Units	Weighted Average Grant Date Fair Value (per unit)
Nonvested awards, December 31, 2019	8,655	$ 152.09
Granted	6,030	141.65
Vested	(1,791)	141.92
Forfeited	(2,049)	153.50
Nonvested awards, December 31, 2020	10,845	$ 147.70

The fair value of the non-vested restricted stock units is based on the trading price of the Company's common stock on the date of grant. The Company adjusts the grant date fair value for expected forfeitures based on historical experience for similar awards. As of December 31, 2020, unrecognized compensation expense related to these awards was $0.8 million, to be recognized over a weighted average remaining period of 2.0 years.

Performance Stock Units

In March 2020, the Company included performance-dependent stock awards ("PSUs") as a component of its LTIP, which will be settled in a certain number of shares subject to market-based and time-based vesting conditions. The number of fully vested shares that may ultimately be issued as settlement for each award may range from 0% up to 200% of the target award, subject to the achievement of the Company's total shareholder return ("TSR") relative to the performance of the Company's peer group, the S&P Midcap 400 Materials group. The service period required for the PSUs is three years and the TSR measurement period for the PSUs is from January 1, 2020 through December 31, 2022.

Compensation expense for PSUs is measured based on their grant date fair value and is recognized on a straight-line basis over the three-year vesting period. The grant-date fair value of the PSUs was estimated using a Monte Carlo simulation on the grant date and using the following assumptions: (i) a risk-free rate of 0.28%; (ii) an expected term of 3.0 years; and (iii) a three-year daily historical volatility for each of the companies in the peer group, including Quaker Houghton.

As of December 31, 2020, the Company estimates that it will issue approximately 20,000 fully vested shares as of the settlement date of the award based on the conditions of the PSUs and Company's closing stock price on December 31, 2020. As of December 31, 2020, there was approximately $2.5 million of total unrecognized compensation cost related to PSUs which the Company expects to recognize over a weighted-average period of 2.2 years.

Annual Incentive Plan

The Company maintains an Annual Incentive Plan ("AIP"), which may be settled in cash or a certain number of shares subject to performance-based and time-based vesting conditions. As previously disclosed within the Company's Form 10-Q for the first three quarters of 2020, it was the Company's intention at that time to settle the 2020 AIP in shares, and therefore, expense associated with the AIP in 2020 was recorded as a component of share-based compensation expense during the first nine months of 2020.

In the fourth quarter of 2020, the Company determined that it would settle the current year AIP in cash. Therefore, the share-based compensation associated with the AIP during the year ended December 31, 2020 was reclassified from a component of share-based compensation expense to incentive compensation. This determination and conclusion had no impact on the classification of AIP expense within the Company's Consolidated Statement of Income for the year ended December 31, 2020 as both are a component of SG&A.

As a result of the change, there was an immaterial impact on the Company's calculation of diluted earnings per share for the year ended December 31, 2020 as the Company no longer considers the estimated number of shares related to a hypothetical AIP settlement in shares as a component of its diluted earnings per share calculation.

In addition, there was no impact on the Company's Consolidated Balance Sheet as of December 31, 2020, as the AIP was and continues to be classified as a liability and included within accrued compensation. Similarly, there was a reclassification on the Company's Consolidated Statement of Cash Flow between lines within Net cash provided by operating activities in the fourth quarter of 2020. The expected cash flow impact of the AIP settled in cash is presented as a component of accounts payable and accrued liabilities for the year ended December 31, 2020.

Defined Contribution Plan

The Company has a 401(k) plan with an employer match covering a majority of its U.S. employees. The Company matches 50% of the first 6% of compensation that is contributed to the plan, with a maximum matching contribution of 3% of compensation. Additionally, the plan provides for non-elective nondiscretionary contributions on behalf of participants who have completed one year of service equal to 3% of the eligible participant's compensation. The Company's matching contributions and non-elective contributions may be made in cash or in fully vested shares of the Company's common stock. Beginning in April 2020, the Company began matching both non-elective and elective 401(k) contributions in fully vested shares of its common stock rather than cash. For the year ended December 31, 2020, total contributions were $3.1 million.

Employee Stock Purchase Plan

In 2000, the Board adopted an Employee Stock Purchase Plan ("ESPP") whereby employees may purchase Company stock through a payroll deduction plan. Purchases were made from the plan and credited to each participant's account on the last day of each calendar month in which the organized securities trading markets in the U.S. were open for business (the "Investment Date"). The purchase price of the stock was 85% of the fair market value on the Investment Date. The plan was compensatory, and the 15% discount was expensed on the Investment Date. All employees, including officers, were eligible to participate in this plan. A participant could withdraw all uninvested payment balances credited to a participant's account at any time. An employee whose stock ownership of the Company exceeds five percent of the outstanding common stock was not eligible to participate in this plan. Effective January 1, 2020, the Company discontinued the ESPP.

2013 Director Stock Ownership Plan

In 2013, the Company adopted the 2013 Director Stock Ownership Plan (the "Plan"), to encourage the Directors to increase their investment in the Company, which was approved at the Company's May 2013 shareholders' meeting. The Plan authorizes the issuance of up to 75,000 shares of Quaker common stock in accordance with the terms of the Plan in payment of all or a portion of the annual cash retainer payable to each of the Company's non-employee directors in 2013 and subsequent years during the term of the Plan. Under the Plan, each director who, on May 1 of the applicable calendar year, owns less than 400% of the annual cash retainer for the applicable calendar year, divided by the average of the closing price of a share of Quaker Common Stock as reported by the composite tape of the New York Stock Exchange for the previous calendar year (the "Threshold Amount"), is required to receive 75% of the annual cash retainer in Quaker common stock and 25% of the retainer in cash, unless the director elects to receive a greater percentage of Quaker common stock, up to 100% of the annual cash retainer for the applicable year. Each director who owns more than the Threshold Amount may elect to receive common stock in payment of a percentage (up to 100%) of the annual cash retainer. The annual retainer is $0.1 million and the retainer payment date is June 1.

Note 9 – Other Expense, net

Other expense, net, for the years ended December 31, 2020, 2019 and 2018 are as follows:

	2020	2019	2018
Income from third party license fees	$ 999	$ 1,035	$ 862
Foreign exchange (losses) gains, net	(6,082)	223	(807)
(Loss) gain on fixed asset disposals, net	(871)	58	657
Non-income tax refunds and other related credits	3,345	1,118	668
Pension and postretirement benefit costs, non-service components	(21,592)	(2,805)	(2,285)
Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery	18,144	60	90
Other non-operating income, net	439	57	173
Total other expense, net	$ (5,618)	$ (254)	$ (642)

Pension and postretirement benefit costs, non-service components during the year ended December 31, 2020 include a $1.6 million refund in premium and a $22.7 million non-cash settlement charge related to the Legacy Quaker U.S. Pension Plan, as described in Note 21 of Notes to Consolidated Financial Statements. Gain on changes in insurance restrictions of an inactive subsidiary and related insurance insolvency recovery relate to the termination of restrictions over certain cash that was previously designated solely to be used for settlement of asbestos claims at an inactive subsidiary of the Company and cash proceeds from an insolvent insurance carrier with respect to previously filed recovery claims. See Note 12, Note 19 and Note 26 of Notes to Consolidated Financial Statements. Foreign exchange (losses) gains, net, during the years ended December 31, 2020, 2019 and 2018, include foreign currency transaction losses of approximately $0.4 million, $1.0 million and $0.4 million, respectively, related to hyper-inflationary accounting for the Company's Argentine subsidiaries, and specific to 2018, a foreign currency transaction gain of approximately $0.4 million related to the liquidation of an inactive legal entity. See Note 1 of Notes to Consolidated Financial Statements. (Loss) gain on fixed asset disposals, net, during the year ended December 31, 2020 and 2018, included $0.6 million loss and a $0.6 million gain, respectively, on the sale of held-for-sale assets related to the Combination.

Note 10 – Taxes on Income

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as U.S. Tax Reform. U.S. Tax Reform implemented a new system of taxation for non-U.S. earnings which eliminated U.S. federal income taxes on dividends from certain foreign subsidiaries and imposed a one-time transition tax on the deemed repatriation of undistributed earnings of certain foreign subsidiaries that is payable over eight years.

Following numerous regulations, notices, and other formal guidance published by the Internal Revenue Service ("I.R.S."), U.S. Department of Treasury, and various state taxing authorities, the Company has completed its accounting for the transition tax and has elected to pay its $15.5 million transition tax in installments over eight years as permitted under U.S. Tax Reform. As of December 31, 2020, $7.0 million in installments have been paid with the remaining $8.5 million to be paid through installments in future years.

As of December 31, 2020, the Company has a deferred tax liability of $5.9 million on certain undistributed foreign earnings, which primarily represents the Company's estimate of the non-U.S. income taxes the Company will incur to ultimately remit certain earnings to the U.S. The Company's reinvestment assertions are further explained below.

Taxes on income before equity in net income of associated companies for the years ended December 31, 2020, 2019 and 2018 are as follows:

	2020	2019	2018
Current:			
Federal	$ (1,359)	$ (239)	$ 6,583
State	1,171	352	(1,844)
Foreign	33,173	26,213	12,114
	32,985	26,326	16,853
Deferred:			
Federal	(28,437)	(9,267)	7,859
State	(3,087)	(396)	(173)
Foreign	(6,757)	(14,579)	511
Total	$ (5,296)	$ 2,084	$ 25,050

The components of earnings before income taxes for the years ended December 31, 2020, 2019 and 2018 are as follows:

	2020	2019	2018
U.S.	$ (66,585)	$ (46,697)	$ 27,387
Foreign	93,724	75,601	55,711
Total	$ 27,139	$ 28,904	$ 83,098

Total deferred tax assets and liabilities are composed of the following as of December 31, 2020 and 2019:

	2020	2019
Retirement benefits	$ 15,237	$ 15,142
Allowance for doubtful accounts	2,316	2,253
Insurance and litigation reserves	842	1,002
Performance incentives	5,914	7,213
Equity-based compensation	1,282	1,050
Prepaid expense	756	2,976
Insurance settlement	—	3,895
Operating loss carryforward	16,693	16,044
Foreign tax credit and other credits	24,873	34,384
Interest	16,812	11,479
Restructuring reserves	1,121	2,167
Right of use lease assets	9,346	10,015
Royalties and license fees	—	2,156
Inventory reserves	2,225	2,163
Research and development	7,974	2,580
Other	3,005	1,317
	108,396	115,836
Valuation allowance	(21,511)	(13,834)
Total deferred tax assets, net	$ 86,885	$ 102,002
Depreciation	15,473	17,754
Foreign pension and other	1,807	1,269
Amortization and other	222,794	254,359
Lease liabilities	9,151	9,965
Outside basis in equity investment	7,938	6,776
Unremitted Earnings	5,919	8,228
Total deferred tax liabilities	$ 263,082	$ 298,351

The Company has $11.3 million of deferred tax assets related to state net operating losses. A partial valuation allowance of $8.0 million has been established against this amount resulting in a net $3.3 million expected future benefit. Management analyzed the expected impact of the reversal of existing taxable temporary differences, considered expiration dates, analyzed current state tax laws, and determined that $3.3 million of state net operating loss carryforwards will be realized based on the reversal of deferred tax liabilities. These state net operating losses are subject to various carryforward periods of 5 years to 20 years or an indefinite carryforward period. An additional $1.0 million of valuation allowance was established for other net state deferred tax assets.

The Company has $5.4 million of deferred tax assets related to foreign net operating loss carryforwards. A partial valuation allowance of $1.7 million has been established against the $5.4 million due to the expected expiration of these losses before they are able to be utilized. These foreign net operating losses are subject to various carryforward periods with the majority having an indefinite carryforward period. An additional partial valuation allowance of $0.6 million has been established against certain other foreign deferred tax assets.

In conjunction with the Combination, the Company acquired foreign tax credit deferred tax assets of $41.8 million expiring between 2019 and 2028. Foreign tax credits may be carried forward for 10 years. As of December 31, 2019, the foreign tax credit carry forward was $33.7 million with an $8.2 million valuation allowance recorded against the deferred tax asset. Management analyzed the expected impact of the utilization of foreign tax credits based on certain assumptions such as projected U.S. taxable income, overall domestic loss recapture, and annual limitations due to the ownership change under the Internal Revenue Code. Consequently, as of December 31, 2020, the foreign tax credit carry forward was $24.9 million with a $10.2 million valuation allowance reflecting the amount of credits that are not expected to be utilized before expiration.

The Company also acquired disallowed interest deferred tax assets of $14.0 million as part of the Combination. Disallowed interest may be carried forward indefinitely. Management analyzed the expected impact of the utilization of disallowed interest carryforwards based on projected US taxable income and determined that the Company will utilize all expected future benefits by 2022. As of December 31, 2020, the Company had a net realizable disallowed interest carryforward of $15.7 million on its balance sheet.

As of December 31, 2020, the Company had deferred tax liabilities of $222.8 million primarily related to the step-up in intangibles resulting from the Combination and Norman Hay acquisition.

As part of the Combination, the Company acquired a 50% interest in the Korea Houghton Corporation joint venture and has recorded a $7.9 million deferred tax liability for its outside basis difference.

The following are the changes in the Company's deferred tax asset valuation allowance for the years ended December 31, 2020, 2019 and 2018:

	Balance at Beginning of Period	**Purchase Accounting Adjustments**	**Additional Valuation Allowance**	**Allowance Utilization and Other**	**Effect of Exchange Rate Changes**	**Balance at End of Period**
Valuation Allowance						
Year ended December 31, 2020	$ 13,834	$ 7,148	$ 2,738	$ (2,153)	$ (56)	$ 21,511
Year ended December 31, 2019	$ 7,520	$ 13,752	$ 832	$ (8,227)	$ (43)	$ 13,834
Year ended December 31, 2018	$ 7,401	$ —	$ 650	$ (471)	$ (60)	$ 7,520

The Company's net deferred tax assets and liabilities are classified in the Consolidated Balance Sheets as of December 31, 2020 and 2019 as follows:

	2020	**2019**
Non-current deferred tax assets	$ 16,566	$ 14,745
Non-current deferred tax liabilities	192,763	211,094
Net deferred tax liability	$ (176,197)	$ (196,349)

The following is a reconciliation of income taxes at the Federal statutory rate with income taxes recorded by the Company for the years ended December 31, 2020, 2019 and 2018:

	2020	2019	2018
Income tax provision at the Federal statutory tax rate	$ 5,699	$ 6,070	$ 17,458
Unremitted earnings	(2,308)	(4,383)	7,857
Tax law changes / reform	(1,059)	(416)	(3,118)
Sub part F / Global intangible low taxed income	5,140	574	2,095
Pension settlement	(2,247)	—	—
Foreign derived intangible income	(7,339)	(1,699)	(1,034)
Non-deductible acquisition expenses	131	1,743	1,019
Withholding taxes	7,809	8,621	1,161
Foreign tax credits	(4,699)	(3,787)	(1,911)
Share-based compensation	335	(540)	259
Foreign tax rate differential	596	920	1,081
Research and development credit	(475)	(306)	(230)
Uncertain tax positions	1,990	899	(79)
State income tax provisions, net	(2,245)	(117)	196
Non-deductible meals and entertainment	290	318	415
Intercompany transfer of intangible assets	(4,384)	(5,318)	—
Miscellaneous items, net	(2,530)	(495)	(119)
Taxes on income before equity in net income of associated companies	$ (5,296)	$ 2,084	$ 25,050

Pursuant to U.S. Tax Reform, the Company recorded a $15.5 million transition tax liability for U.S. income taxes on the undistributed earnings of non-U.S. subsidiaries. However, the Company may also be subject to other taxes, such as withholding taxes and dividend distribution taxes, if these undistributed earnings are ultimately remitted to the U.S. As a result of the Combination, additional third-party debt was incurred resulting in the Company re-evaluating its global cash strategy in order to meet its goal of reducing leverage in upcoming years. As of December 31, 2020, the Company has a deferred tax liability $5.9 million, which primarily represents the estimate of the non-U.S. taxes the Company will incur to ultimately remit these earnings to the U.S. It is the Company's current inten tion to reinvest its additional undistributed earnings of non-U.S. subsidiaries to support working capital needs and certain other growth initiatives outside of the U.S. The amount of such undistributed earnings at December 31, 2020 was approximately $322.6 million. Any tax liability which might result from ultimate remittance of these earnings is expected to be substantially offset by foreign tax credits (subject to certain limitations). It is currently impractical to estimate any such incremental tax expense.

As of December 31, 2020, the Company's cumulative liability for gross unrecognized tax benefits was $22.2 million. The Company had accrued approximately $3.9 million for cumulative penalties and $3.0 million for cumulative interest as of December 31, 2020. As of December 31, 2019, the Company's cumulative liability for gross unrecognized tax benefits was $19.1 million. The Company had accrued approximately $3.1 million for cumulative penalties and $2.3 million for cumulative interest as of December 31, 2019.

The Company continues to recognize interest and penalties associated with uncertain tax positions as a component of tax expense on income before equity in net income of associated companies in its Consolidated Statements of Income. The Company recognized an expense of less than $0.1 million for penalties and $0.6 million for interest (net of expirations and settlements) in its Consolidated Statement of Income for the year ended December 31, 2020, a credit of $0.2 million for penalties and an expense of $0.2 million for interest (net of expirations and settlements) in its Consolidated Statement of Income for the year ended December 31, 2019, and a credit of $0.2 million for penalties and a credit of $0.1 million for interest (net of expirations and settlements) in its Consolidated Statement of Income for the year ended December 31, 2018.

The Company estimates that during the year ending December 31, 2021, it will reduce its cumulative liability for gross unrecognized tax benefits by approximately $1.5 million due to the expiration of the statute of limitations with regard to certain tax positions. This estimated reduction in the cumulative liability for unrecognized tax benefits does not consider any increase in liability for unrecognized tax benefits with regard to existing tax positions or any increase in cumulative liability for unrecognized tax benefits with regard to new tax positions for the year ending December 31, 2021.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits for the years ended December 31, 2020, 2019 and 2018, respectively, is as follows:

	2020	2019	2018
Unrecognized tax benefits as of January 1	$ 19,097	$ 7,050	$ 6,761
Increase (decrease) in unrecognized tax benefits taken in prior periods	2,025	(28)	(183)
Increase in unrecognized tax benefits taken in current period	3,095	1,935	2,023
Decrease in unrecognized tax benefits due to lapse of statute of limitations	(3,659)	(1,029)	(1,292)
Increase in unrecognized tax benefits due to acquisition	597	11,301	—
Increase (decrease) due to foreign exchange rates	997	(132)	(259)
Unrecognized tax benefits as of December 31	$ 22,152	$ 19,097	$ 7,050

The amount of net unrecognized tax benefits above that, if recognized, would impact the Company's tax expense and effective tax rate is $14.7 million, $13.3 million and $2.2 million for the years ended December 31, 2020, 2019 and 2018, respectively.

The Company and its subsidiaries are subject to U.S. Federal income tax, as well as the income tax of various state and foreign tax jurisdictions. Tax years that remain subject to examination by major tax jurisdictions include Italy from 2006, Brazil from 2011, Mexico, the Netherlands and China from 2015, Spain, Germany and the United Kingdom from 2016, Canada and the U.S. from 2017, India from fiscal year beginning April 1, 2018 and ending March 31, 2019, and various U.S. state tax jurisdictions from 2011.

As previously reported, the Italian tax authorities have assessed additional tax due from the Company's subsidiary, Quaker Italia S.r.l., relating to the tax years 2007 through 2015. The Company filed for competent authority relief from these assessments under the Mutual Agreement Procedures ("MAP") of the Organization for Economic Co-Operation and Development for all years except 2007. In 2020, the respective tax authorities in Italy, Spain, and Netherland reached agreement with respect to the MAP proceedings, which the Company has accepted. As a result, the Company has recorded an estimated tax liability of $0.9 million to finalize these proceedings, net of refunds expected to be received from the Spanish and Dutch tax authorities. As of December 31, 2020, the Company believes it has adequate reserves for uncertain tax positions with respect to these and all other audits.

Houghton Italia, S.r.l is also currently involved in a corporate income tax audit with the Italian tax authorities covering tax years 2014 through 2018. As of December 31, 2020, the Company has a $5.8 million reserve for uncertain tax positions relating to matters related to this audit. Since this reserve relates to the tax periods prior to August 1, 2019, the tax liability was established through purchase accounting related to the Combination. The Company has also submitted an indemnification claim against funds held in escrow by Houghton's former owners and as a result, a corresponding $5.8 million indemnification receivable has also been established through purchase accounting.

Houghton Deutschland GmbH is also under audit by the German tax authorities for tax years 2015-2017. Based on preliminary audit findings, primarily related to transfer pricing, the Company has recorded a reserve for $0.9 million as of December 31, 2020. Of this amount, $0.8 million relates to tax periods prior to the Combination and therefore the Company has submitted an indemnification claim with Houghton's former owners for any tax liabilities arising pre-Combination. As a result, a corresponding $0.8 million indemnification receivable has also been established to offset the $0.8 million tax liability.

Note 11 – Earnings Per Share

The following table summarizes earnings per share calculations for the years ended December 31, 2020, 2019 and 2018:

	2020	2019	2018
Basic earnings per common share			
Net income attributable to Quaker Chemical Corporation	$ 39,658	$ 31,622	$ 59,473
Less: income allocated to participating securities	(148)	(90)	(253)
Net income available to common shareholders	$ 39,510	$ 31,532	$ 59,220
Basic weighted average common shares outstanding	17,719,792	15,126,928	13,268,047
Basic earnings per common share	$ 2.23	$ 2.08	$ 4.46
Diluted earnings per common share			
Net income attributable to Quaker Chemical Corporation	$ 39,658	$ 31,622	$ 59,473
Less: income allocated to participating securities	(148)	(90)	(252)
Net income available to common shareholders	$ 39,510	$ 31,532	$ 59,221
Basic weighted average common shares outstanding	17,719,792	15,126,928	13,268,047
Effect of dilutive securities	31,087	36,243	36,685
Diluted weighted average common shares outstanding	17,750,879	15,163,171	13,304,732
Diluted earnings per common share	$ 2.22	$ 2.08	$ 4.45

The Company's calculation of earnings per diluted share attributable to Quaker Chemical Corporation common shareholders for the year ended December 31, 2019 was impacted by the variability of its reported earnings during the year and the approximately 4.3 million shares issued as a component of the consideration transferred in the Combination, comprising 24.5% of the common stock of the Company immediately after the closing. Certain stock options and restricted stock units are not included in the diluted earnings per share calculation because the effect would have been anti-dilutive. The calculated amount of anti-diluted shares not included were 945 in 2020, 108 in 2019 and 1,808 in 2018.

Note 12 – Restricted Cash

Prior to December 2020, the Company had restricted cash recorded in other assets related to proceeds from an inactive subsidiary of the Company which previously executed separate settlement and release agreements with two of its insurance carriers for an original total value of $35.0 million. The proceeds of both settlements were restricted and could only be used to pay claims and costs of defense associated with the subsidiary's asbestos litigation. The proceeds of the settlement and release agreements were deposited into interest bearing accounts which earned less then $0.1 million and $0.2 million in the years ended December 31, 2020 and 2019, respectively, offset by $1.0 million and $0.8 million of net payments during 2020 and 2019, respectively. Due to the restricted nature of the proceeds, a corresponding deferred credit was established in other non-current liabilities for an equal and offsetting amount.

During December 2020, the restrictions ended on these previously received insurance settlements and the Company transferred the cash into an operating account. In connection with the termination in restrictions, the Company recognized an $18.1 million gain on its Consolidated Statement of Income in Other expense, net, for the amount of previously restricted cash, net of the estimated liability to pay claims and associated with the inactive subsidiary's asbestos litigation as of December 31, 2020. See Notes 18, 22 and 26 of Notes to Consolidated Financial Statements.

The following table provides a reconciliation of cash, cash equivalents and restricted cash as December 31, 2020, 2019, 2018 and 2017:

	2020	2019	2018	2017
Cash and cash equivalents	$ 181,833	$ 123,524	$ 104,147	$ 89,879
Restricted cash included in other current assets	62	353	—	—
Restricted cash included in other assets	—	19,678	20,278	21,171
Cash, cash equivalents and restricted cash	$ 181,895	$ 143,555	$ 124,425	$ 111,050

Note 13 – Accounts Receivable and Allowance for Doubtful Accounts

As of December 31, 2020 and 2019, the Company had gross trade accounts receivable totaling $386.1 million and $387.7 million, respectively.

The Company recognizes an allowance for credit losses, which represents the portion of the receivable that the Company does not expect to collect over its contractual life, considering past events and reasonable and supportable forecasts of future economic conditions. The Company estimates credit losses for trade receivables by aggregating similar customer types, because they tend to share similar credit risk characteristics. The Company's allowance for credit losses on its trade accounts receivable is based on specific collectability facts and circumstances for each outstanding receivable and customer, the aging of outstanding receivables, and the associated collection risk the Company estimates for certain past due aging categories, and also, the general risk to all outstanding accounts receivable based on historical amounts determined to be uncollectible. Trade and other receivables are written off when there is no reasonable expectation of recovery.

The following are changes in the allowance for doubtful accounts during the years ended December 31, 2020, 2019 and 2018:

	Balance at Beginning of Period	Changes to Costs and Expenses	Write-Offs Charged to Allowance	Exchange Rate Changes and Other Adjustments	Balance at End of Period
Allowance for Doubtful Accounts					
Year ended December 31, 2020	$ 11,716	$ 3,582	$ (2,187)	$ 34	$ 13,145
Year ended December 31, 2019	$ 5,187	$ 1,925	$ (322)	$ 4,926	$ 11,716
Year ended December 31, 2018	$ 5,457	$ 493	$ (295)	$ (468)	$ 5,187

Included in exchange rate changes and other adjustments for the year ended December 31, 2019 are the allowance for doubtful accounts of $5.0 million related to the acquired receivables in connection with the Combination and Norman Hay acquisition. See Note 2 of Notes to Consolidated Financial Statements. Included in exchange rate changes and other adjustments for the year ended December 31, 2018 is a reclassification of $0.3 million to other assets related to certain customer receivables due greater than a year.

Note 14 – Inventories

Inventories, net, as of December 31, 2020 and 2019 were as follows:

	2020	2019
Raw materials and supplies	$ 86,148	$ 82,058
Work in process, finished goods and reserves	101,616	92,892
Total inventories, net	$ 187,764	$ 174,950

Note 15 – Property, Plant and Equipment

Property, plant and equipment as of December 31, 2020 and 2019 were as follows:

	2020	2019
Land	$ 33,009	$ 34,686
Building and improvements	135,595	130,462
Machinery and equipment	246,242	225,636
Construction in progress	8,407	8,050
Property, plant and equipment, at cost	423,253	398,834
Less: accumulated depreciation	(219,370)	(185,365)
Total property, plant and equipment, net	$ 203,883	$ 213,469

As of December 31, 2020, PP&E includes $0.4 million of finance lease assets and future minimum lease payments. In connection with the plans for closure of certain facilities, certain buildings and land with an aggregate book value of approximately $10.0 million continue to be held-for-sale as of December 31, 2020 and are recorded in other current assets on the Company's Consolidated Balance Sheet.

Note 16 – Goodwill and Other Intangible Assets

Changes in the carrying amount of goodwill for the years ended December 31, 2020 and 2019 were as follows:

	Americas	EMEA	Asia/Pacific	Global Specialty Businesses	Total
Balance as of December 31, 2018	$ 28,464	$ 17,423	$ 13,149	$ 24,297	$ 83,333
Goodwill additions	188,494	114,167	130,091	91,545	524,297
Currency translation adjustments	(573)	1,428	(1,513)	233	(425)
Balance as of December 31, 2019	216,385	133,018	141,727	116,075	607,205
Goodwill additions	1,485	531	—	1,329	3,345
Currency translation and other adjustments	(4,628)	6,613	16,363	2,314	20,662
Balance as of December 31, 2020	$ 213,242	$ 140,162	$ 158,090	$ 119,718	$ 631,212

Other adjustments in the table above includes updates to the Company's allocation of the Houghton purchase price and associated goodwill to each of the Company's reportable segments during the year ended December 31, 2020, including a $2.6 million decrease in the Americas, a $1.4 million decrease in EMEA, a $8.0 million increase in Asia/Pacific and a $0.5 million increase in Global Specialty Businesses.

Gross carrying amounts and accumulated amortization for definite-lived intangible assets as of December 31, 2020 and 2019 were as follows:

	Gross Carrying Amount		Accumulated Amortization	
	2020	2019	2020	2019
Customer lists and rights to sell	$ 839,551	$ 792,362	$ 99,806	$ 49,932
Trademarks, formulations and product technology	166,448	157,049	30,483	21,299
Other	6,372	6,261	5,824	5,776
Total definite-lived intangible assets	$ 1,012,371	$ 955,672	$ 136,113	$ 77,007

The Company recorded $55.9 million, $26.7 million and $7.3 million of amortization expense during the years ended December 31, 2020, 2019 and 2018, respectively. Amortization is recorded within SG&A in the Company's Consolidated Statements of Income. Estimated annual aggregate amortization expense for the subsequent five years is as follows:

For the year ended December 31, 2021	$ 58,752
For the year ended December 31, 2022	58,590
For the year ended December 31, 2023	58,361
For the year ended December 31, 2024	57,935
For the year ended December 31, 2025	57,263

The Company has four indefinite-lived intangible assets totaling $205.1 million as of December 31, 2020, including $204.0 million of indefinite-lived intangible assets for trademarks and tradename associated with the Combination. Comparatively, the Company had four indefinite-lived intangible assets for trademarks and tradename totaling $243.1 million as of December 31, 2019.

The Company completes its annual goodwill and indefinite-lived intangible asset impairment test during the fourth quarter of each year, or more frequently if triggering events indicate a possible impairment in one or more of its reporting units. The Company completed its annual impairment assessment during the fourth quarter of 2020 and concluded no impairment charge was warranted. The Company continually evaluates financial performance, economic conditions and other relevant developments in assessing if an interim period impairment test for one or more of its reporting units is necessary.

As of March 31, 2020, the Company evaluated the initial impact of COVID-19 on the Company's operations, and the volatility and uncertainty in the economic outlook as a result of COVID-19 to determine if they indicated it was more likely than not that the carrying value of any of the Company's reporting units or indefinite-lived or long-lived assets was not recoverable. The Company concluded that the impact of COVID-19 did not represent a triggering event as of March 31, 2020 with regards to the Company's reporting units or indefinite-lived and long-lived assets, except for the Company's Houghton and Fluidcare trademarks and tradename indefinite-lived intangible assets.

The determination of estimated fair value of the Houghton and Fluidcare trademarks and tradename indefinite-lived assets was based on a relief from royalty valuation method which requires management's judgment and often involves the use of significant estimates and assumptions, including assumptions with respect to the weighted average cost of capital ("WACC") and royalty rates, as well as revenue growth rates and terminal growth rates. In the first quarter of 2020, as a result of the impact of COVID-19 driving a decrease in projected legacy Houghton net sales in the current year and the impact of the current year decline on projected future legacy Houghton net sales as well as an increase in the WACC assumption utilized in the quantitative impairment assessment, the Company concluded that the estimated fair values of the Houghton and Fluidcare trademarks and tradename intangible assets were less than their carrying values. As a result, an impairment charge of $38.0 million, primarily related to the Houghton trademarks and tradename, to write down the carrying values of these intangible assets to their estimated fair values was recorded in the first quarter of 2020.

As of December 31, 2020, the Company continued to evaluate the on-going impact of COVID-19 on the Company's operations, and the volatility and uncertainty in the economic outlook as a result of COVID-19, to determine if this indicated it was more likely than not that the carrying value of any of the Company's reporting units or indefinite-lived or long-lived intangible assets were not recoverable. The Company concluded that the impact of COVID-19 did not represent a triggering event as of December 31, 2020 with regards to any of the Company's reporting units or indefinite-lived and long-lived intangible assets.

While the Company concluded that the impact of COVID-19 did not represent a triggering event as of December 31, 2020 for any of its other long-lived or indefinite-lived assets or reporting units, the Company will continue to evaluate the impact of COVID-19 on the Company's current and projected results. If the current economic conditions worsen or projections of the timeline for recovery are significantly extended, then the Company may conclude in the future that the impact from COVID-19 requires the need to perform further interim quantitative impairment tests, which could result in additional impairment charges in the future.

Note 17 – Investments in Associated Companies

As of December 31, 2020, the Company held a 50% investment in and had significant influence over Nippon Quaker Chemical, Ltd. ("Nippon Japan"), Kelko Quaker Chemical, S.A. ("Kelko Panama") and Houghton Korea acquired in 2019 in connection with the Combination, and held a 32% investment in and had significant influence over Primex, Ltd. ("Primex"). See Note 2 of Notes to Consolidated Financial Statements.

The carrying amount of the Company's equity investments as of December 31, 2020 was $95.8 million, which includes investments of $68.3 million in Houghton Korea; $19.4 million in Primex; $7.8 million in Nippon Japan; and $0.3 million in Kelko Panama.

The Company also has a 50% equity interest in Kelko Venezuela. Due to heightened foreign exchange controls, deteriorating economic circumstances and other restrictions in Venezuela, during 2018 the Company concluded that it no longer had significant influence over this affiliate. Prior to this determination, the Company historically accounted for this affiliate under the equity method. As of December 31, 2020 and 2019, the Company had no remaining carrying value for its investment in Kelko Venezuela.

The following table is a summary of equity income in associated companies by investment for the years ending December 31, 2020, 2019 and 2018:

	Year Ended December 31,		
	2020	**2019**	**2018**
Houghton Korea	$ 5,241	$ 2,337	$ —
Nippon Japan	853	850	713
Kelko Panama	107	55	222
Kelko Venezuela	—	—	(138)
Primex	1,151	1,822	966
Total equity in net income of associated companies	$ 7,352	$ 5,064	$ 1,763

As the Combination closed on August 1, 2019, the Company included five months of equity income from Houghton Korea in its December 31, 2019 Consolidated Statement of Income.

Note 18 – Other Non-Current Assets

Other non-current assets as of December 31, 2020 and 2019 were as follows:

	2020	2019
Uncertain tax positions	$ 7,209	$ 4,993
Pension assets	6,748	—
Debt issuance costs	5,919	7,571
Indemnification assets	7,615	4,006
Supplemental retirement income program	1,961	1,782
Restricted insurance settlement	—	19,678
Other	2,344	2,403
Total other assets	$ 31,796	$ 40,433

During December 2020, the restrictions lapsed over certain cash that was previously only designated to be used for settlement of asbestos claims at an inactive subsidiary of the Company. As of December 31, 2020 and 2019, indemnification assets relates to certain Houghton foreign subsidiaries for which the Company expects it will incur additional tax amounts which are subject to indemnification under the terms of the Combination share and purchase agreement. These indemnification assets have a corresponding uncertain tax position recorded in other non-current liabilities. As of December 31, 2020, one of the Company's foreign pension plan's fair value of plan assets exceeded its gross benefit obligation and was therefore over-funded, which is represented by the line Pension assets in the table above. See Notes 10, 12, 21 and 22 of Notes to Consolidated Financial Statements.

Note 19 – Other Accrued Liabilities

Other accrued liabilities as of December 31, 2020 and 2019 were as follows:

	2020	2019
Non-income taxes	$ 26,080	$ 21,176
Current income taxes payable	13,124	7,503
Professional fees, legal, and acquisition-related accruals	11,437	17,103
Short-term lease liabilities	10,901	11,177
Selling expenses and freight accruals	10,475	11,350
Customer advances and sales return reserves	6,380	5,554
Other	13,710	9,742
Total other accrued liabilities	$ 92,107	$ 83,605

Note 20 – Debt

Debt as of December 31, 2020 and 2019 includes the following:

	As of December 31, 2020		As of December 31, 2019	
	Interest Rate	Outstanding Balance	Interest Rate	Outstanding Balance
Credit Facilities:				
Revolver	1.65%	$ 160,000	3.20%	$ 171,169
U.S. Term Loan	1.65%	570,000	3.20%	600,000
EURO Term Loan	1.50%	157,062	1.50%	151,188
Industrial development bonds	5.26%	10,000	5.26%	10,000
Bank lines of credit and other debt obligations	Various	2,072	Various	2,608
Total debt		$ 899,134		$ 934,965
Less: debt issuance costs		(11,099)		(14,196)
Less: short-term and current portion of long-term debts		(38,967)		(38,332)
Total long-term debt		$ 849,068		$ 882,437

Credit facilities

The Company's primary credit facility (as amended, the "Credit Facility") is comprised of a $400.0 million multicurrency revolver (the "Revolver"), a $600.0 million term loan (the "U.S. Term Loan"), each with the Company as borrower, and a $150.0 million (as of August 1, 2019) Euro equivalent term loan (the "EURO Term Loan" and together with the "U.S. Term Loan", the "Term Loans") with Quaker Chemical B.V., a Dutch subsidiary of the Company as borrower, each with a five-year term maturing in August 2024. Subject to the consent of the administrative agent and certain other conditions, the Company may designate additional borrowers. The maximum amount available under the Credit Facility can be increased by up to $300.0 million at the Company's request if there are lenders who agree to accept additional commitments and the Company has satisfied certain other conditions. Borrowings under the Credit Facility bear interest at a base rate or LIBOR plus an applicable margin based upon the Company's consolidated net leverage ratio. There are LIBOR replacement provisions that contemplate a further amendment if and when LIBOR ceases to be reported. The variable interest rate incurred on the outstanding borrowings under the Credit Facility during the year ended December 31, 2020 was approximately 2.2%. As of December 31, 2020, the variable interest rate on the outstanding borrowings under the Credit Facility was approximately 1.6%. In addition to paying interest on outstanding principal under the Credit Facility, the Company is required to pay a commitment fee ranging from 0.2% to 0.3% depending on the Company's consolidated net leverage ratio to the lenders under the Revolver in respect of the unutilized commitments thereunder. The Company has unused capacity under the Revolver of approximately $234 million, net of bank letters of credit of approximately $6 million, as of December 31, 2020. Until closing of the Combination, the Company incurred ticking fees to maintain the bank commitment, which began to accrue on September 29, 2017. Concurrent with the closing of the Combination and executing the Credit Facility on August 1, 2019, the Company paid approximately $6.3 million of ticking fees.

The Credit Facility is subject to certain financial and other covenants. The Company's initial consolidated net debt to consolidated adjusted EBITDA ratio could not exceed 4.25 to 1, with step downs in the permitted ratio over the term of the Credit Facility. As of December 31, 2020, the consolidated net debt to adjusted EBITDA may not exceed 4.00 to 1. The Company's consolidated adjusted EBITDA to interest expense ratio cannot be less than 3.0 to 1 over the term of the agreement. The Credit Facility also prohibits the payment of cash dividends if the Company is in default or if the amount of the dividend paid annually exceeds the greater of $50.0 million and 20% of consolidated adjusted EBITDA unless the ratio of consolidated net debt to consolidated adjusted EBITDA is less than 2.0 to 1, in which case there is no such limitation on amount. As of December 31, 2020 and December 31, 2019, the Company was in compliance with all of the Credit Facility covenants. The Term Loans have quarterly principal amortization during their five-year terms, with 5.0% amortization of the principal balance due in years 1 and 2, 7.5% in year 3, and 10.0% in years 4 and 5, with the remaining principal amount due at maturity. During the year ended December 31, 2020, the Company made four quarterly amortization payments related to the Term Loans totaling $37.6 million. The Credit Facility is guaranteed by certain of the Company's domestic subsidiaries and is secured by first priority liens on substantially all of the assets of the Company and the domestic subsidiary guarantors, subject to certain customary exclusions. The obligations of the Dutch borrower are guaranteed only by certain foreign subsidiaries on an unsecured basis.

The Credit Facility required the Company to fix its variable interest rates on at least 20% of its total Term Loans. In order to satisfy this requirement as well as to manage the Company's exposure to variable interest rate risk associated with the Credit Facility, in November 2019, the Company entered into $170.0 million notional amounts of three-year interest rate swaps at a base rate of 1.64% plus an applicable margin as provided in the Credit Facility, based on the Company's consolidated net leverage ratio. At the time the Company entered into the swaps, and as of December 31, 2020, the aggregate interest rate on the swaps, including the fixed base rate plus an applicable margin, was 3.1%. See Note 25 of Notes to Consolidated Financial Statements.

The Company capitalized $23.7 million of certain third-party debt issuance costs in connection with executing the Credit Facility. Approximately $15.5 million of the capitalized costs were attributed to the Term Loans and recorded as a direct reduction of long-term debt on the Company's Consolidated Balance Sheet. Approximately $8.3 million of the capitalized costs were attributed to the Revolver and recorded within other assets on the Company's Consolidated Balance Sheet. These capitalized costs are being amortized into interest expense over the five-year term of the Credit Facility. As of December 31, 2020 and 2019, the Company had $11.1 million and $14.2 million, respectively, of debt issuance costs recorded as a reduction of long-term debt. As of December 31, 2020 and 2019, the Company had $5.9 million and $7.6 million, respectively, of debt issuance costs recorded within other assets.

Industrial development bonds

As of December 31, 2020 and 2019, the Company had fixed rate, industrial development authority bonds totaling $10.0 million in principal amount due in 2028. These bonds have similar covenants to the Credit Facility noted above.

The Company also had a $5.0 million industrial development authority bond bearing interest at a rate of 5.60%, which matured and was paid off during the fourth quarter of 2018.

Bank lines of credit and other debt obligations

The Company has certain unsecured bank lines of credit and discounting facilities in certain foreign subsidiaries, which are not collateralized. The Company's other debt obligations primarily consist of certain domestic and foreign low interest rate or interest-free municipality-related loans, local credit facilities of certain foreign subsidiaries and capital lease obligations. Total unused capacity under these arrangements as of December 31, 2020 was approximately $40 million.

In addition to the bank letters of credit described in the "Credit facilities" subsection above, the Company's only other off-balance sheet arrangements include certain financial and other guarantees. The Company's total bank letters of credit and guarantees outstanding as of December 31, 2020 were approximately $10 million.

The Company incurred the following debt related expenses included within Interest expense, net, in the Consolidated Statements of Income:

	Year Ended December 31,		
	2020	2019	2018
Interest expense	$ 23,552	$ 16,788	$ 6,158
Amortization of debt issuance costs	4,749	1,979	70
Total	$ 28,301	$ 18,767	$ 6,228

Based on the variable interest rates associated with the Credit Facility, as of December 31, 2020 and 2019, the amounts at which the Company's total debt were recorded are not materially different from their fair market value.

At December 31, 2020, annual maturities on long-term borrowings maturing in the next five fiscal years (excluding the reduction to long-term debt attributed to capitalized and unamortized debt issuance costs) are as follows:

2021	$ 38,795
2022	57,850
2023	76,943
2024	715,227
2025	231

Note 21 – Pension and Other Postretirement Benefits

The following table shows the funded status of the Company's plans' reconciled with amounts reported in the Consolidated Balance Sheets as of December 31, 2020 and 2019:

	Pension Benefits						Other Post-Retirement Benefits	
	2020			2019			2020	2019
	Foreign	U.S.	Total	Foreign	U.S.	Total	U.S.	U.S.
Change in benefit obligation								
Gross benefit obligation at beginning of year	$ 217,893	$ 153,723	$ 371,616	$ 111,316	$ 58,734	$ 170,050	$ 4,266	$ 4,106
Service cost	4,340	491	4,831	3,507	434	3,941	5	6
Interest cost	3,416	2,923	6,339	3,046	3,313	6,359	77	143
Employee contributions	73	—	73	73	—	73	—	—
Effect of plan amendments	—	50	50	30	—	30	—	—
Curtailment gain	(2,324)	—	(2,324)	—	—	—	—	—
Plan settlements	(2,316)	(53,494)	(55,810)	(1,087)	—	(1,087)	—	—
Benefits paid	(5,087)	(6,138)	(11,225)	(3,832)	(6,034)	(9,866)	(250)	(384)
Plan expenses and premiums paid	(135)	—	(135)	(129)	—	(129)	—	—
Transfer in of business acquisition	—	—	—	85,658	86,414	172,072	—	—
Actuarial loss (gain)	16,834	12,414	29,248	13,616	10,862	24,478	(864)	395
Translation differences and other	14,981	—	14,981	5,695	—	5,695	—	—
Gross benefit obligation at end of year	$ 247,675	$ 109,969	$ 357,644	$ 217,893	$ 153,723	$ 371,616	$ 3,234	$ 4,266

	Pension Benefits						Other Post-Retirement Benefits	
	2020			2019			2020	2019
	Foreign	**U.S.**	**Total**	**Foreign**	**U.S.**	**Total**	**U.S.**	**U.S.**
Change in plan assets								
Fair value of plan assets at beginning of year	$ 195,099	$ 120,550	$ 315,649	$ 94,826	$ 49,415	$ 144,241	$ —	$ —
Actual return on plan assets	20,367	10,759	31,126	13,458	10,663	24,121	—	—
Employer contributions	6,912	2,302	9,214	5,223	1,087	6,310	250	384
Employee contributions	73	—	73	73	—	73	—	—
Plan settlements	(2,316)	(53,494)	(55,810)	(1,087)	—	(1,087)	—	—
Benefits paid	(5,087)	(6,138)	(11,225)	(3,832)	(6,034)	(9,866)	(250)	(384)
Plan expenses and premiums paid	(135)	(498)	(633)	(129)	(500)	(629)	—	—
Transfer in of business acquisition	—	—	—	81,068	65,919	146,987	—	—
Translation differences	13,876	—	13,876	5,499	—	5,499	—	—
Fair value of plan assets at end of year	$ 228,789	$ 73,481	$ 302,270	$ 195,099	$ 120,550	$ 315,649	$ —	$ —
Net benefit obligation recognized	$ (18,886)	$ (36,488)	$ (55,374)	$ (22,794)	$ (33,173)	$ (55,967)	$ (3,234)	$ (4,266)
Amounts recognized in the balance sheet consist of:								
Non-current assets	$ 6,748	$ —	$ 6,748	$ —	$ —	$ —	$ —	$ —
Current liabilities	(568)	(612)	(1,180)	(359)	(2,620)	(2,979)	(286)	(426)
Non-current liabilities	(25,066)	(35,876)	(60,942)	(22,435)	(30,553)	(52,988)	(2,948)	(3,840)
Net benefit obligation recognized	$ (18,886)	$ (36,488)	$ (55,374)	$ (22,794)	$ (33,173)	$ (55,967)	$ (3,234)	$ (4,266)
Amounts not yet reflected in net periodic benefit costs and included in accumulated other comprehensive loss:								
Prior service credit	(26)	50	24	1,271	—	1,271	—	—
Accumulated loss	(21,976)	(5,532)	(27,508)	(22,816)	(46,560)	(69,376)	124	(734)
AOCI	(22,002)	(5,482)	(27,484)	(21,545)	(46,560)	(68,105)	124	(734)
Cumulative employer contributions (below) or in excess of net periodic benefit cost	3,116	(31,006)	(27,890)	(1,249)	13,387	12,138	(3,358)	(3,532)
Net benefit obligation recognized	$ (18,886)	$ (36,488)	$ (55,374)	$ (22,794)	$ (33,173)	$ (55,967)	$ (3,234)	$ (4,266)

The accumulated benefit obligation for all defined benefit pension plans was $344.4 million ($109.5 million U.S. and $234.9 million Foreign) and $366.0 million ($152.9 million U.S. and approximately $213.1 million Foreign) as of December 31, 2020 and 2019, respectively.

Information for pension plans with an accumulated benefit obligation in excess of plan assets:

	2020			2019		
	Foreign	**U.S.**	**Total**	**Foreign**	**U.S.**	**Total**
Projected benefit obligation	$ 32,373	$ 109,969	$ 142,342	$ 217,893	$ 153,723	$ 371,616
Accumulated benefit obligation	30,892	109,540	140,432	213,060	152,930	365,990
Fair value of plan assets	18,074	73,481	91,555	195,099	120,550	315,649

Information for pension plans with a projected benefit obligation in excess of plan assets:

	2020			2019		
	Foreign	**U.S.**	**Total**	**Foreign**	**U.S.**	**Total**
Projected benefit obligation	$ 32,373	$ 109,969	$ 142,342	$ 217,893	$ 153,723	$ 371,616
Fair value of plan assets	18,074	73,481	91,555	195,099	120,550	315,649

Components of net periodic benefit costs – pension plans:

	2020			2019		
	Foreign	**U.S.**	**Total**	**Foreign**	**U.S.**	**Total**
Service cost	$ 4,340	$ 491	$ 4,831	$ 3,507	$ 434	$ 3,941
Interest cost	3,416	2,923	6,339	3,046	3,313	6,359
Expected return on plan assets	(4,262)	(4,810)	(9,072)	(3,668)	(3,227)	(6,895)
Settlement loss	(88)	22,667	22,579	258	—	258
Curtailment charge	(1,155)	—	(1,155)	—	—	—
Actuarial loss amortization	886	2,110	2,996	757	2,348	3,105
Prior service (credit) cost amortization	(167)	—	(167)	(165)	—	(165)
Net periodic benefit cost	$ 2,970	$ 23,381	$ 26,351	$ 3,735	$ 2,868	$ 6,603

	2018		
	Foreign	**U.S.**	**Total**
Service cost	$ 3,426	$ 383	$ 3,809
Interest cost	2,254	1,847	4,101
Expected return on plan assets	(2,228)	(2,803)	(5,031)
Settlement loss	2	—	2
Actuarial loss amortization	881	2,276	3,157
Prior service (credit) cost amortization	(175)	59	(116)
Net periodic benefit cost	$ 4,160	$ 1,762	$ 5,922

Other changes recognized in other comprehensive income – pension plans:

	2020			2019		
	Foreign	**U.S.**	**Total**	**Foreign**	**U.S.**	**Total**
Net (gain) loss arising during the period	$ (1,594)	$ 1,536	$ (58)	$ 3,826	$ 3,926	$ 7,752
Effect of plan amendment						
Recognition of amortization in net periodic benefit cost						
Settlement (loss)	(39)	(22,667)	(22,706)	—	—	—
Prior service credit (cost)	1,325	50	1,375	196	—	196
Actuarial loss	(758)	3,967	3,209	(1,015)	(2,347)	(3,362)
Curtailment Recognition	(3)	—	(3)	—	—	—
Effect of exchange rates on amounts included in AOCI	1,535	—	1,535	(61)	—	(61)
Total recognized in other comprehensive loss (income)	466	(17,114)	(16,648)	2,946	1,579	4,525
Total recognized in net periodic benefit cost and other comprehensive loss (income)	$ 3,436	$ 6,267	$ 9,703	$ 6,681	$ 4,447	$ 11,128

	2018		
	Foreign	U.S.	Total
Net gain arising during period	$ (663)	$ 453	$ (210)
Recognition of amortization in net periodic benefit cost			
Prior service credit (cost)	175	(59)	116
Actuarial loss	(883)	(2,276)	(3,159)
Effect of exchange rates on amounts included in AOCI	(890)	—	(890)
Total recognized in other comprehensive loss	(2,261)	(1,882)	(4,143)
Total recognized in net periodic benefit cost and other comprehensive loss	$ 1,899	$ (120)	$ 1,779

Components of net periodic benefit costs – other postretirement plan:

	2020	2019	2018
Service cost	$ 5	$ 6	$ 7
Interest cost	77	143	130
Actuarial loss amortization	(5)	—	42
Net periodic benefit costs	$ 77	$ 149	$ 179

Other changes recognized in other comprehensive income – other postretirement benefit plans:

	2020	2019	2018
Net (gain) loss arising during period	$ (864)	$ 395	$ (443)
Amortization of actuarial loss in net periodic benefit costs	5	—	(42)
Total recognized in other comprehensive (income) loss	(859)	395	(485)
Total recognized in net periodic benefit cost and other comprehensive (income) loss	$ (782)	$ 544	$ (306)

Weighted-average assumptions used to determine benefit obligations as of December 31, 2020 and 2019:

	Pension Benefits		Other Postretirement Benefits	
	2020	2019	2020	2019
U.S. Plans:				
Discount rate	2.19 %	3.06 %	2.05 %	2.98 %
Rate of compensation increase	6.00 %	6.00 %	N/A	N/A
Foreign Plans:				
Discount rate	1.79 %	1.83 %	N/A	N/A
Rate of compensation increase	2.74 %	2.58 %	N/A	N/A

Weighted-average assumptions used to determine net periodic benefit costs for the years ended December 31, 2020 and 2019:

	Pension Benefits		Other Postretirement Benefits	
	2020	**2019**	**2020**	**2019**
U.S. Plans:				
Discount rate	3.11 %	4.08 %	2.99 %	4.03 %
Expected long-term return on plan assets	6.50 %	5.75 %	N/A	N/A
Rate of compensation increase	6.00 %	5.50 %	N/A	N/A
Foreign Plans:				
Discount rate	2.30 %	2.30 %	N/A	N/A
Expected long-term return on plan assets	2.20 %	3.13 %	N/A	N/A
Rate of compensation increase	2.79 %	2.87 %	N/A	N/A

The long-term rates of return on assets were selected from within the reasonable range of rates determined by (a) historical real returns for the asset classes covered by the investment policy and (b) projections of inflation over the long-term period during which benefits are payable to plan participants. See Note 1 of Notes to Consolidated Financial Statements for further information.

Assumed health care cost trend rates as of December 31, 2020 and 2019:

	2020	**2019**
Health care cost trend rate for next year	5.70 %	5.90 %
Rate to which the cost trend rate is assumed to decline (the ultimate trend rate)	4.50 %	4.50 %
Year that the rate reaches the ultimate trend rate	2037	2037

Plan Assets and Fair Value

The Company's pension plan target asset allocation and the weighted-average asset allocations as of December 31, 2020 and 2019 by asset category were as follows:

Asset Category	**Target**	**2020**	**2019**
U.S. Plans			
Equity securities	10 %	58 %	32 %
Debt securities	90 %	36 %	64 %
Other	0 %	6 %	4 %
Total	100 %	100 %	100 %
Foreign Plans			
Equity securities	37 %	33 %	34 %
Debt securities	53 %	45 %	45 %
Other	10 %	22 %	21 %
Total	100 %	100 %	100 %

As of December 31, 2020 and 2019, "Other" consisted principally of cash and cash equivalents, and investments in real estate funds.

The following is a description of the valuation methodologies used for the investments measured at fair value, including the general classification of such instruments pursuant to the valuation hierarchy, where applicable:

Cash and Cash Equivalents

Cash and cash equivalents consist of cash and money market funds and are classified as Level 1 investments.

Commingled Funds

Investments in the U.S. pension plan and foreign pension plan commingled funds represent pooled institutional investments, including primarily collective investment trusts. These commingled funds are not available on an exchange or in an active market and these investments are valued using their net asset value ("NAV"), which is generally based on the underlying asset values of the investments held in the trusts.

As of December 31, 2020, the foreign pension plan commingled funds included approximately 35 percent of investments in equity securities, 51 percent of investments in fixed income securities, and 14 percent of other non-related investments, primarily real estate.

Pooled Separate Accounts

Investments in the U.S. pension plan pooled separate accounts consist of annuity contracts and are valued based on the reported unit value at year end. Units of the pooled separate account are not traded on an exchange or in an active market; however, valuation is based on the underlying investments of each pooled separate account and are classified as Level 2 investments. As of December 31, 2020, the U.S. pension plan pooled separate accounts included approximately 61 percent of investments in equity securities and 39 percent of investments in fixed income securities.

Fixed Income Government Securities

Investments in foreign pension plans fixed income government securities were valued using third party pricing services which are based on a combination of quoted market prices on an exchange in an active market as well as proprietary pricing models and inputs using observable market data and are classified as Level 2 investments.

Insurance Contract

Investments in the foreign pension plan insurance contract are valued at the highest value available for the Company at year end, either the reported cash surrender value of the contract or the vested benefit obligation. Both the cash surrender value and the vested benefit obligation are determined based on unobservable inputs, which are contractually or actuarially determined, regarding returns, fees, the present value of the future cash flows of the contract and benefit obligations. The contract is classified as a Level 3 investment.

Diversified Equity Securities- Registered Investment Companies

Investments in the foreign pension plans diversified equity securities of registered investment companies are based upon the quoted redemption value of shares in the fund owned by the plan at year end. The shares of the fund are not available on an exchange or in an active market; however, the fair value is determined based on the underlying investments in the fund as traded on an exchange in an active market and are classified as Level 2 investments.

Fixed Income – Foreign Registered Investment Companies

Investments in the foreign pension plans fixed income securities of foreign registered investment companies are based upon the quoted redemption value of shares in the fund owned by the plan at year end. The shares of the fund are not available on an exchange or in an active market; however, the fair value is determined based on the underlying investments in the fund as traded on an exchange in an active market and are classified as Level 2 investments.

Diversified Investment Fund - Registered Investment Companies

Investments in the foreign pension plan diversified investment fund of registered investment companies are based upon the quoted redemption value of shares in the fund owned by the plan at year end. This fund is not available on an exchange or in an active market and this investment is valued using its NAV, which is generally based on the underlying asset values of the investments held. As of December 31, 2020, the diversified investment funds included approximately 62 percent of investments in equity securities, 19 percent of investments in fixed income securities, and 19 percent of other alternative investments.

Other – Alternative Investments

Investments in the foreign pension plans include certain other alternative investments such as inflation and interest rate swaps. These investments are valued based on unobservable inputs, which are contractually or actuarially determined, regarding returns, fees, the present value of future cash flows of the contract and benefit obligations. These alternative investments are classified as Level 3 investments.

Real Estate

The U.S. and foreign pension plans' investment in real estate consists of investments in property funds. The funds' underlying investments consist of real property which are valued using unobservable inputs. These property funds are classified as a Level 3 investment.

As of December 31, 2020 and 2019, the U.S. and foreign plans' investments measured at fair value on a recurring basis were as follows:

		Fair Value Measurements at December 31, 2020		
	Total	Using Fair Value Hierarchy		
U.S. Pension Assets	**Fair Value**	**Level 1**	**Level 2**	**Level 3**
Pooled separate accounts	$ 69,385	$ —	$ 69,385	$ —
Real estate	4,096	—	—	4,096
Subtotal U.S. pension plan assets in fair value hierarchy	$ 73,481	$ —	$ 69,385	$ 4,096
Total U.S. pension plan assets	$ 73,481			
Foreign Pension Assets				
Cash and cash equivalents	$ 634	$ 634	$ —	$ —
Insurance contract	112,920	—	—	112,920
Diversified equity securities - registered investment companies	8,851	—	8,851	—
Fixed income – foreign registered investment companies	3,711	—	3,711	—
Fixed income government securities	37,579	—	37,579	—
Real estate	5,679	—	—	5,679
Other - alternative investments	10,638	—	—	10,638
Sub-total of foreign pension assets in fair value hierarchy	$ 180,012	$ 634	$ 50,141	$ 129,237
Commingled funds measured at NAV	2,368			
Diversified investment fund - registered investment companies measured at NAV	46,409			
Total foreign pension assets	$ 228,789			
Total pension assets in fair value hierarchy	$ 253,493	$ 634	$ 119,526	$ 133,333
Total pension assets measured at NAV	48,777			
Total pension assets	$ 302,270			

		Fair Value Measurements at December 31, 2019		
	Total	**Using Fair Value Hierarchy**		
U.S. Pension Assets	**Fair Value**	**Level 1**	**Level 2**	**Level 3**
Cash and cash equivalents	$ 450	$ 450	$ —	$ —
Pooled separate accounts	64,636	—	64,636	—
Real estate	4,060	—	—	4,060
Subtotal U.S. pension plan assets in fair value hierarchy	$ 69,146	$ 450	$ 64,636	$ 4,060
Commingled funds measured at NAV	51,404			
Total U.S. pension plan assets	$ 120,550			
Foreign Pension Assets				
Cash and cash equivalents	$ 1,502	$ 1,502	$ —	$ —
Insurance contract	92,657	—	—	92,657
Diversified equity securities - registered investment companies	8,604	—	8,604	—
Fixed income – foreign registered investment companies	3,021	—	3,021	—
Fixed income government securities	32,512	—	32,512	—
Real estate	5,521	—	—	5,521
Other - alternative investments	9,436	—	—	9,436
Sub-total of foreign pension assets in fair value hierarchy	$ 153,253	$ 1,502	$ 44,137	$ 107,614
Commingled funds measured at NAV	2,037			
Diversified investment fund - registered investment companies measured at NAV	39,809			
Total foreign pension assets	$ 195,099			
Total pension assets in fair value hierarchy	$ 222,399	$ 1,952	$ 108,773	$ 111,674
Total pension assets measured at NAV	93,250			
Total pension assets	$ 315,649			

Certain investments that are measured at fair value using the NAV per share (or its equivalent) have not been classified in the fair value hierarchy. The fair value amounts presented for these investments in the preceding tables are intended to permit reconciliation of the fair value hierarchies to the line items presented in the statements of net assets available for benefits.

Changes in the fair value of the plans' Level 3 investments during the years ended December 31, 2020 and 2019 were as follows:

	Insurance		**Alternative**	
	Contract	**Real Estate**	**Investments**	**Total**
Balance as of December 31, 2018	$ 79,873	2,382	—	$ 82,255
Purchases	3,762	—	1,029	4,791
Assets acquired in business combinations	129	7,058	8,914	16,101
Sales	—	(238)	(278)	(516)
Settlements	(1,730)	—	—	(1,730)
Unrealized (losses) gains	12,199	403	(960)	11,642
Currency translation adjustment	(1,576)	(24)	731	(869)
Balance as of December 31, 2019	92,657	9,581	9,436	111,674
Purchases	3,902	18	989	4,909
Settlements	(2,027)	—	—	(2,027)
Unrealized gains (losses)	8,917	(16)	(171)	8,730
Currency translation adjustment	9,471	192	384	10,047
Balance as of December 31, 2020	$ 112,920	$ 9,775	$ 10,638	$ 133,333

In the fourth quarter of 2018, the Company began the process of terminating its Legacy Quaker noncontributory U.S. pension plan ("Legacy Quaker U.S. Pension Plan"). During the third quarter of 2019, the Company received a favorable termination determination letter from the Internal Revenue Service ("I.R.S.") and completed the Legacy Quaker U.S. Pension Plan termination during the first quarter of 2020. In order to terminate the Legacy Quaker U.S. Pension Plan in accordance with I.R.S. and Pension Benefit Guaranty Corporation requirements, the Company was required to fully fund the Legacy Quaker U.S. Pension Plan on a termination basis and the amount necessary to do so was approximately $1.8 million, subject to final true up adjustments. In the third quarter of 2020, the Company finalized the amount of the liability and related annuity payments and received a refund in premium of approximately $1.6 million. In addition, the Company recorded a non-cash pension settlement charge at plan termination of approximately $22.7 million. This settlement charge included the immediate recognition into expense of the related unrecognized losses within AOCI on the balance sheet as of the plan termination date.

In connection with the Combination, the Company indirectly acquired all of Houghton's defined benefit pension plans, which are included in the tables set forth above. The pension plans cover certain U.S. salaried and hourly employees as well as certain employees in the U.K., France and Germany. The Houghton U.S. plans provide benefits based on an employee's years of service and compensation received for the highest five consecutive years of earnings. The foreign plans provide benefits based on a formula of years and service and a percentage of compensation which varies among the various countries.

The Company contributes to a multiemployer defined benefit pension plan under terms of a collective bargaining union contract (the Cleveland Bakers and Teamsters Pension Fund, Employer Identification Number: 34-0904419-001). The expiration date of the collective bargaining contract is May 1, 2022. As of January 1, 2019, the last valuation date available for the multiemployer plan, total plan liabilities were approximately $589 million. As of December 31, 2019, the multiemployer pension plan had total plan assets of approximately $364 million. The Company's contribution rate to the multiemployer pension plan is specified in the collective bargaining union contract and contributions are made to the plan based on its union employee payroll. The Company contributed $0.1 million during the year ended December 31, 2020. The Employee Retirement Income Security Act of 1974, as amended by the Multi-Employer Pension Plan Amendments Act of 1980, imposes certain contingent liabilities upon an employer who is a contributor to a multiemployer pension plan if the employer withdraws from the plan or the plan is terminated or experiences a mass withdrawal. While the Company may also have additional liabilities imposed by law as a result of its participation in the multiemployer defined benefit pension plan, there is no liability as of December 31, 2020.

The Pension Protection Act of 2006 (the "PPA") also added special funding and operational rules generally applicable to plan years beginning after 2007 for multiemployer plans with certain classifications based on a multitude of factors (including, for example, the plan's funded percentage, cash flow position and whether the plan is projected to experience a minimum funding deficiency). The plan to which the Company contributes is in "critical" status. Plans in the "critical" status classification must adopt measures to improve their funded status through a funding improvement or rehabilitation plan which may require additional contributions from employers (which may take the form of a surcharge on benefit contributions) and/or modifications to retiree benefits. The amount of additional funds that the Company may be obligated to contribute to the plan in the future cannot be estimated as such amounts will be likely based on future levels of work that require the specific use of those union employees covered by the plan, and the amount of that future work and the number of affected employees that may be needed is not reasonably estimable.

Cash Flows

Contributions

The Company expects to make minimum cash contributions of approximately $10.0 million to its pension plans (approximately $5.9 million U.S. and $4.1 million Foreign) and approximately $0.3 million to its other postretirement benefit plan in 2021.

Estimated Future Benefit Payments

Excluding any impact related to the PPA noted above, the following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

	Pension Benefits			Other Post-Retirement
	Foreign	**U.S.**	**Total**	**Benefits**
2021	$ 6,658	$ 5,923	$ 12,581	$ 286
2022	6,939	5,298	12,237	278
2023	7,024	6,072	13,096	265
2024	6,745	6,234	12,979	245
2025	7,394	6,228	13,622	226
2025 to 2029	42,522	30,443	72,965	923

The Company maintains a plan under which supplemental retirement benefits are provided to certain officers. Benefits payable under the plan are based on a combination of years of service and existing postretirement benefits. Included in total pension costs are charges of $2.5 million, $1.8 million and $1.6 million for the years ended December 31, 2020, 2019 and 2018, respectively, representing the annual accrued benefits under this plan.

Defined Contribution Plan

The Company has a 401(k) plan with an employer match covering a majority of its U.S. employees. The plan allows for and the Company previously paid a nonelective contribution on behalf of participants who have completed one year of service equal to 3% of the eligible participants' compensation in the form of Company common stock. During 2019 and 2018, the Company made both non-elective and elective 401(k) matching contributions in cash, rather than stock. Beginning in April 2020, the Company began matching both non-elective and elective 401(k) contributions in fully vested shared of the Company's common stock rather than cash. See Note 8 of Notes to Consolidated Financial Statements. Total Company contributions were $5.7 million, $4.0 million and $3.1 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Note 22 – Other Non-Current Liabilities

Other non-current liabilities as of December 31, 2020 and 2019 were as follows:

	2020	2019
Inactive subsidiary litigation and settlement reserve	$ 542	$ 19,678
Non-current income taxes payable	8,500	8,500
Uncertain tax positions (includes interest and penalties)	28,961	24,609
Fair value of interest rate swaps	4,672	415
Environmental reserves	4,610	5,259
Deferred and other long-term compensation	6,257	6,625
Other	1,627	1,298
Total other non-current liabilities	$ 55,169	$ 66,384

The line item Inactive subsidiary litigation and settlement reserve in the table above was previously titled Restricted insurance settlement and has been updated in the current year related to the December 2020 termination of restrictions on the previously restricted amounts, as described in Note 12 of Notes to Consolidated Financial Statements.

Note 23 – Equity and Accumulated Other Comprehensive Loss

The Company has 30,000,000 shares of common stock authorized with a par value of $1, and 17,850,616 and 17,735,162 shares issued and outstanding as of December 31, 2020 and 2019, respectively. The change in shares issued and outstanding during 2020 was primarily related to 49,906 shares issued for share-based compensation plans and 65,548 shares issued for the exercise of stock options and other share activity.

The Company is authorized to issue 10,000,000 shares of preferred stock with $1 par value, subject to approval by the Board of Directors. The Board of Directors may designate one or more series of preferred stock and the number of shares, rights, preferences, and limitations of each series. As of December 31, 2020, no preferred stock had been issued.

The Company has a share repurchase program that was approved by its Board of Directors in 2015 for the repurchase of up to $100.0 million of Quaker Chemical Corporation common stock. The Company has not repurchased any shares under the program for the years ended December 31, 2020, 2019 and 2018. As of December 31, 2020, there was approximately $86.9 million of common stock remaining to be purchased under this share repurchase program.

The following table shows the reclassifications from and resulting balances of AOCI for the years ended December 31, 2020, 2019 and 2018:

	Currency Translation Adjustments	Defined Benefit Pension Plans	Unrealized Gain (Loss) in Available-for-Sale Securities	Derivative Instruments	Total
Balance as of December 31, 2017	$ (31,893)	$ (34,093)	$ 886	$ —	$ (65,100)
Other comprehensive (loss) income before reclassifications	(17,429)	1,543	(2,622)	—	(18,508)
Amounts reclassified from AOCI	—	3,085	435	—	3,520
Related tax amounts	—	(1,086)	459	—	(627)
Balance as of December 31, 2018	(49,322)	(30,551)	(842)	—	(80,715)
Other comprehensive income (loss) before reclassifications	4,754	(8,088)	2,951	(415)	(798)
Amounts reclassified from AOCI	—	3,169	(301)	—	2,868
Related tax amounts	—	937	(557)	95	475
Balance as of December 31, 2019	(44,568)	(34,533)	1,251	(320)	(78,170)
Other comprehensive income (loss) before reclassifications	41,693	(6,617)	2,848	(4,257)	33,667
Amounts reclassified from AOCI	—	24,141	(202)	—	23,939
Related tax amounts	—	(6,458)	(555)	979	(6,034)
Balance as of December 31, 2020	$ (2,875)	$ (23,467)	$ 3,342	$ (3,598)	$ (26,598)

All reclassifications related to unrealized gain (loss) in available-for-sale securities relate to the Company's equity interest in a captive insurance company and are recorded in equity in net income of associated companies. The amounts reported in other comprehensive income for non-controlling interest are related to currency translation adjustments.

Note 24 – Fair Value Measures

The Company has valued its company-owned life insurance policies at fair value. These assets are subject to fair value measurement as follows:

		Fair Value Measurements at December 31, 2020		
	Total	Using Fair Value Hierarchy		
Assets	Fair Value	Level 1	Level 2	Level 3
Company-owned life insurance	$ 1,961	$ —	$ 1,961	$ —
Total	$ 1,961	$ —	$ 1,961	$ —

		Fair Value Measurements at December 31, 2019		
	Total	Using Fair Value Hierarchy		
Assets	Fair Value	Level 1	Level 2	Level 3
Company-owned life insurance	$ 1,782	$ —	$ 1,782	$ —
Total	$ 1,782	$ —	$ 1,782	$ —

The fair values of Company-owned life insurance assets are based on quotes for like instruments with similar credit ratings and terms. The Company did not hold any Level 3 investments as of December 31, 2020 or 2019, respectively, so related disclosures have not been included.

Note 25 – Hedging Activities

In order to satisfy certain requirements of the Credit Facility as well as to manage the Company's exposure to variable interest rate risk associated with the Credit Facility, in November 2019, the Company entered into $170.0 million notional amounts of three-year interest rate swaps. See Note 20 of Notes to Consolidated Financial Statements. These interest rate swaps are designated as cash flow hedges and, as such, the contracts are marked-to-market at each reporting date and any unrealized gains or losses are included in AOCI to the extent effective and reclassified to interest expense in the period during which the transaction effects earnings or it becomes probable that the forecasted transaction will not occur. The Company did not utilize derivatives designated as cash flow hedges during the year ended December 31, 2018.

The balance sheet classification and fair values of the Company's derivative instruments, which are Level 2 measurements, are as follows:

	Consolidated Balance Sheet Location	Fair Value December 31, 2020	Fair Value December 31, 2019
Derivatives designated as cash flow hedges:			
Interest rate swaps	Other non-current liabilities	$ 4,672	$ 415
		$ 4,672	$ 415

The following table presents the net unrealized loss deferred to AOCI:

		December 31, 2020	December 31, 2019
Derivatives designated as cash flow hedges:			
Interest rate swaps	AOCI	$ 3,598	$ 320
		$ 3,598	$ 320

The following table presents the net loss reclassified from AOCI to earnings:

		For the Years Ended December 31, 2020	2019	2018
Amount and location of (expense) income reclassified from AOCI into (expense) income (Effective Portion)	Interest expense, net	$ (1,754)	$ 29	$ —

Interest rate swaps are entered into with a limited number of counterparties, each of which allows for net settlement of all contracts through a single payment in a single currency in the event of a default on or termination of any one contract. As such, in accordance with the Company's accounting policy, these derivative instruments are recorded on a net basis within the Consolidated Balance Sheets.

Note 26 – Commitments and Contingencies

In 1992, the Company identified certain soil and groundwater contamination at AC Products, Inc. ("ACP"), a wholly owned subsidiary. In voluntary coordination with the Santa Ana California Regional Water Quality Board, ACP has been remediating the contamination, the principal contaminant of which is perchloroethylene ("PERC"). In 2004, the Orange County Water District ("OCWD") filed a civil complaint against ACP and other parties seeking to recover compensatory and other damages related to the investigation and remediation of the contamination in the groundwater. Pursuant to a settlement agreement with OCWD, ACP agreed, among other things, to operate the two groundwater treatment systems to hydraulically contain groundwater contamination emanating from ACP's site until the concentrations of PERC released by ACP fell below the current Federal maximum contaminant level for four consecutive quarterly sampling events. In 2014, ACP ceased operation at one of its two groundwater treatment systems, as it had met the above condition for closure. In 2020, the Santa Ana Regional Water Quality Control Board asked that ACP conduct some additional indoor and outdoor soil vapor testing on and near the ACP site to confirm that ACP continues to meet the applicable local standards and ACP has begun the testing program. As of December 31, 2020, ACP believes it is close to meeting the conditions for closure of the remaining groundwater treatment system but continues to operate this system while in discussions with the relevant authorities.

As of December 31, 2020, the Company believes that the range of potential-known liabilities associated with the balance of ACP water remediation program is approximately $0.1 million to $1.0 million. The low and high ends of the range are based on the length of operation of the treatment system as determined by groundwater modeling. Costs of operation include the operation and maintenance of the extraction well, groundwater monitoring and program management.

An inactive subsidiary of the Company that was acquired in 1978 sold certain products containing asbestos, primarily on an installed basis, and is among the defendants in numerous lawsuits alleging injury due to exposure to asbestos. The subsidiary discontinued operations in 1991 and has no remaining assets other than proceeds received from insurance settlements. To date, the overwhelming majority of these claims have been disposed of without payment and there have been no adverse judgments against the subsidiary. Based on a continued analysis of the existing and anticipated future claims against this subsidiary, it is currently projected that the subsidiary's total liability over the next 50 years for these claims is approximately $0.5 million (excluding costs of defense). Although the Company has also been named as a defendant in certain of these cases, no claims have been actively pursued against the Company, and the Company has not contributed to the defense or settlement of any of these cases pursued against the subsidiary.

These cases were handled by the subsidiary's primary and excess insurers who had agreed in 1997 to pay all defense costs and be responsible for all damages assessed against the subsidiary arising out of existing and future asbestos claims up to the aggregate limits of their policies. A significant portion of this primary insurance coverage was provided by an insurer that is insolvent, and the other primary insurers asserted that the aggregate limits of their policies had been exhausted. The subsidiary challenged the applicability of these limits to the claims being brought against the subsidiary. In response, two of the three carriers entered into separate settlement and release agreements with the subsidiary in 2005 and 2007 for $15.0 million and $20.0 million, respectively.

The proceeds of both settlements were restricted and could only be used to pay claims and costs of defense associated with the subsidiary's asbestos litigation. In 2007, the subsidiary and the remaining primary insurance carrier entered into a Claim Handling and Funding Agreement, under which the carrier is paying 27% of defense and indemnity costs incurred by or on behalf of the subsidiary in connection with asbestos bodily injury claims. The agreement continues until terminated and can only be terminated by either party by providing a minimum of two years prior written notice. As of December 31, 2020, no notice of termination has been given under this agreement.

At the end of the term of the agreement, the subsidiary may choose to again pursue its claim against this insurer regarding the application of the policy limits. The Company believes that, if the coverage issues under the primary policies with the remaining carrier are resolved adversely to the subsidiary and all settlement proceeds were used, the subsidiary may have limited additional coverage from a state guarantee fund established following the insolvency of one of the subsidiary's primary insurers. Nevertheless, liabilities in respect of claims may exceed the assets and coverage available to the subsidiary.

If the subsidiary's assets and insurance coverage were to be exhausted, claimants of the subsidiary may actively pursue claims against the Company because of the parent-subsidiary relationship. The Company does not believe that such claims would have merit or that the Company would be held to have liability for any unsatisfied obligations of the subsidiary as a result of such claims. After evaluating the nature of the claims filed against the subsidiary and the small number of such claims that have resulted in any payment, the potential availability of additional insurance coverage at the subsidiary level, the additional availability of the Company's own insurance and the Company's strong defenses to claims that it should be held responsible for the subsidiary's obligations because of the parent-subsidiary relationship, the Company believes it is not probable that the Company will incur losses. The Company has been successful to date having any claims naming it dismissed during initial proceedings. Since the Company may be in this stage of litigation for some time, it is not possible to estimate additional losses or range of loss, if any.

As a result of the closing of the Combination on August 1, 2019, the Company is party to environmental matters related to certain Houghton domestic and foreign properties currently or previously owned, described below. These environmental matters primarily require the Company to perform long-term monitoring as well as operating and maintenance at each of the applicable sites. The Company continually evaluates its obligations related to such matters, and based on historical costs incurred and projected costs to be incurred over the next 28 years, has estimated the present value range of costs for all of the Houghton environmental matters, on a discounted basis, to be between approximately $5.5 million and $6.5 million as of December 31, 2020, for which $6.0 million is accrued within other accrued liabilities and other non-current liabilities on the Company's Consolidated Balance Sheet as of December 31, 2020. Comparatively, as of December 31, 2019, the Company had $6.6 million accrued for with respect to these matters.

Houghton's Sao Paulo, Brazil site was required under Brazilian environmental, health and safety regulations to perform an environmental assessment as part of a permit renewal process. Initial investigations identified soil and ground water contamination in select areas of the site. The site has conducted a multi-year soil and groundwater investigation and corresponding risk assessments based on the result of the investigations. In 2017, the site had to submit a new 5-year permit renewal request and was asked to complete additional investigations to further delineate the site based on review of the technical data by the local regulatory agency, Companhia Ambiental do Estado de São Paulo ("CETESB"). Based on review of the updated investigation data, CETESB issued a

Technical Opinion regarding the investigation and remedial actions taken to date. The site developed an action plan and submitted it to CETESB in 2018 based on CETESB requirements. The site intervention plan primarily requires the site, amongst other actions, to conduct periodic monitoring for methane in soil vapors, source zone delineation, groundwater plume delineation, bedrock aquifer assessment, update the human health risk assessment, develop a current site conceptual model and conduct a remedial feasibility study and provide a revised intervention plan.

In December 2019, the site submitted a report on the activities completed including the revised site conceptual model and results of the remedial feasibility study and recommended remedial strategy for the site. Other Houghton environmental matters include participation in certain payments in connection with four currently active environmental consent orders related to certain hazardous waste cleanup activities under the U.S. Federal Superfund statute. Houghton has been designated a potentially responsible party ("PRP") by the Environmental Protection Agency along with other PRPs depending on the site, and has other obligations to perform cleanup activities at certain other foreign subsidiaries. These environmental matters primarily require the Company to perform long-term monitoring as well as operating and maintenance at each of the applicable sites.

The Company believes, although there can be no assurance regarding the outcome of other unrelated environmental matters, that it has made adequate accruals for costs associated with other environmental problems of which it is aware. Approximately $0.1 million and $0.2 million were accrued as of December 31, 2020 and 2019, respectively, to provide for such anticipated future environmental assessments and remediation costs.

During the fourth quarter of 2020, one of the Company's subsidiaries received a notice of inspection from a taxing authority in a country where certain of its subsidiaries operate which related to a non-income (indirect) tax that may be applicable to certain products the subsidiary sells. To date, the Company has not received any assessment from the authority related to potential liabilities that may be due from the Company's subsidiary. Consequently, there is substantial uncertainty with respect to the Company's ultimate liability with respect to this indirect tax, as the application of this tax in its given market is ambiguous and interpreted differently among other peer companies and taxing authorities. The Company, with assistance from independent experts, has performed an evaluation of the applicability of this indirect tax to the Company's subsidiaries in this country. Information available to the Company at this time is only sufficient to establish a range of probable liability, and no amount within the range is considered a better estimate than another. Based on this evaluation, the Company recorded a liability of $1.5 million in other accrued liabilities, which reflects the low end of the range of probable indirect tax owed, including interest and taking into account applicable statutes of limitations. Because these amounts in part relate to a Houghton entity acquired in the Combination and for periods prior to the Combination, the Company has submitted an indemnification claim with Houghton's former owners related to this potential indirect tax liability. The Company recorded a receivable in other assets for approximately $1.1 million, which reflects the amount of the $1.5 million recorded liability for which the Company anticipates being indemnified. The impact of this indirect tax, net of the recorded indemnification asset, was approximately $0.4 million and was recorded as a component of SG&A during the fourth quarter of 2020. As noted, the Company believes there is substantial uncertainty with respect to its ultimate liability given the ambiguous application of this indirect tax. At this time, the Company's best estimate of a potential range for possible assessments, including additional amounts that may be assessed under these indirect tax laws, would be approximately $0.4 million to $34 million, which is net of approximately $9 million of estimated income tax deductions and approximately $22 million of applicable rights to indemnification from Houghton's former owners.

The Company is party to other litigation which management currently believes will not have a material adverse effect on the Company's results of operations, cash flows or financial condition. In addition, the Company has an immaterial amount of contractual purchase obligations.

Note 27 – COVID-19 Global Pandemic

In early 2020, a global outbreak of COVID-19 occurred initially in China and then across all locations where the Company does business, and which continued throughout the rest of the year. In March 2020, the World Health Organization formally identified the COVID-19 outbreak as a pandemic. In an effort to halt the outbreak of COVID-19, the governments of impacted countries, including but not limited to the U.S., the European Union, and China, have taken various actions to reduce its spread, including travel restrictions, shutdowns of businesses deemed nonessential, and stay-at-home or similar orders. This outbreak and associated measures to reduce its spread have caused significant disruptions to the operations of the Company and its suppliers and customers. The disruptions and negative impact to the Company include significant volume declines and lower net sales initially at its China subsidiaries in the first quarter of 2020 and beginning in late March continued throughout the rest of 2020 at almost all of its other sites as the global economy slowed significantly in response to the pandemic. Management continues to monitor the impact that the COVID-19 pandemic is having on the Company, the overall specialty chemical industry, and the economies and markets in which the Company operates.

Further, management continues to evaluate how COVID-19-related circumstances, such as remote work arrangements, have affected financial reporting processes, internal control over financial reporting, and disclosure controls and procedures. While the circumstances have presented and are expected to continue to present challenges, at this time, management does not believe that

COVID-19 has had a material impact on financial reporting processes, internal control over financial reporting, and disclosure controls and procedures.

The full extent of the COVID-19 pandemic related business and travel restrictions and changes to business and consumer behavior intended to reduce its spread are uncertain as of the date of this Report as COVID-19 and the responses of governmental authorities continue to evolve globally. The Company cannot reasonably estimate the magnitude of the effects these conditions will have on the Company's operations in the future as they are subject to significant uncertainties relating to the ultimate geographic spread of the virus, the incidence and severity of the symptoms, the duration or resurgence of the outbreak, the length of the travel restrictions and business closures imposed by governments of impacted countries, and the economic response by governments of impacted countries.

To the extent that the Company's customers and suppliers continue to be significantly and adversely impacted by COVID-19, this could reduce the availability, or result in delays, of materials or supplies to or from the Company, which in turn could significantly interrupt the Company's business operations. Such impacts could grow and become more significant to the Company's operations and the Company's liquidity or financial position. Therefore, given the speed and frequency of continuously evolving developments with respect to this pandemic, the Company cannot reasonably estimate the magnitude or the full extent to which COVID-19 may impact the Company's results of operations, liquidity or financial position.

Item 9. ***Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.***

Not Applicable.

Item 9A. ***Controls and Procedures.***

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

As required by Rule 13a-15(b) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), our management, including our principal executive officer and principal financial officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act) as of the end of the period covered by this report. Based on that evaluation, our principal executive officer and our principal financial officer have concluded that, as of the end of the period covered by this Report, our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act) were not effective as of December 31, 2020 because of the material weaknesses in our internal control over financial reporting, as described below.

Notwithstanding these material weaknesses, the Company has concluded that the audited consolidated financial statements included in this Report present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows and changes in equity for each of the years in the three-year period ended December 31, 2020, in conformity with accounting principles generally accepted in the United States.

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting as such term is defined in Rule 13a-15(f) under the Exchange Act. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.

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

Our management, with the participation of our principal executive officer and principal financial officer, assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2020. In making this assessment, our management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control—Integrated Framework (2013) (the "COSO framework"). A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of annual or interim financial statements will not be prevented or detected on a timely basis. We identified certain deficiencies in our application of the principles associated with the COSO framework that management concluded constituted a material weakness. We did not design and maintain effective controls in response to the risks of material misstatement. Specifically, changes to existing controls or the implementation of new controls were not sufficient to respond to changes to the risks of material misstatement in financial reporting as a result of becoming a larger, more complex global organization due to the Combination. This material weakness also contributed to an additional material weakness as we did not design and maintain effective controls over the review of pricing, quantity and customer data to verify that revenue recognized was complete and accurate. These material weaknesses did not result in material misstatements to the interim or annual consolidated financial statements. However, these material weaknesses could result in misstatements to our account balances and disclosures that could result in a material misstatement to the interim or annual consolidated financial statements that would not be prevented or detected. Therefore, management concluded that the Company's internal control over financial reporting was not effective as of December 31, 2020.

Management has excluded the internal controls of Tel Nordic ApS and Coral Chemical Company from our assessment of internal control over financial reporting as of December 31, 2020, because these entities were acquired by the Company in purchase business combinations in May 2020 and December 2020, respectively. These excluded entities are wholly owned subsidiaries, whose total assets represent less than 1% and approximately 2%, respectively, and whose total revenues each represent less than 1%, of the related consolidated financial statement amounts as of and for the year ended December 31, 2020.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2020 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in its report which is included in "Item 8. Financial Statements and Supplementary Data."

Progress on Remediation of Material Weaknesses

The aforementioned material weaknesses, as well as the remediated business combination material weakness discussed below, were previously disclosed in ***"Item 9A. Controls and Procedures."*** in the Company's 2019 Form 10-K. The Company and its Board of Directors are committed to maintaining a strong internal control environment. Since identifying the material weaknesses, the Company has dedicated a significant amount of time and resources to remediate all of the previously identified material weaknesses as quickly and effectively as possible. In 2020, the Company dedicated multiple internal resources and supplemented those internal resources with various third-party specialists to assist with the formalization of a robust and detailed remediation plan. In undertaking remediation activities, the Company has hired additional personnel dedicated to financial and information technology compliance to further supplement its internal resources. In addition, the Company has established a global network of personnel to assist local management in understanding control performance and documentation requirements. In order to sustain this network, the Company conducts periodic trainings and hosts discussions to address questions on a current basis. However, the impact of COVID-19, including travel restrictions and remote work arrangements required the Company to adapt and make changes to its internal controls integration plans as well as its remediation plans, and has presented and is expected to continue to present challenges with regards to the timing of the Company's remediation and integration plan activities. In addition, the Company was executing its plan of remediation in the current year while also integrating its past Houghton and Norman Hay acquisitions into the Company's control framework.

Remediation of Business Combination Material Weakness

Through these efforts described above, the Company was able to implement its plan to remediate the previously identified material weakness concerning the reliability of data used to support the reasonableness of certain assumptions in the accounting for business combinations, including updating the Company's design and documentation as well as implementing changes to certain internal controls to specifically address this control deficiency. The Company was able to document, test and evaluate the updated internal controls in the given year so as to successfully remediate this material weakness as of December 31, 2020.

Management's Remediation Initiatives for the Risk Assessment and Revenue – Price and Quantity Material Weaknesses

Despite the challenges brought on by COVID-19 and driven by the Company's priority of creating a long-term sustainable control structure to ensure stability for a Company that has more than doubled in size since August 2019, the Company did make substantial strides towards remediating the underlying causes of the previously disclosed material weaknesses in our risk assessment process and within our revenue process in the current year, as further discussed below.

Risk Assessment – Specific to the material weakness in our risk assessment process that was previously disclosed in ***"Item 9A. Controls and Procedures."*** in the Company's 2019 Form 10-K , we previously determined that our risk assessment process was not designed adequately to respond to changes to the risks of material misstatement to financial reporting. In order to remediate this material weakness, we have designed and implemented an improved risk assessment process, including identifying and assessing those risks attendant to the significant changes within the Company as a result of becoming a larger, more complex global organization due to the Combination. During 2020, a full review was performed of our processes and controls across significant locations in order to identify and address potential design gaps. In addition to individual transactional-level control enhancements, this review resulted in (i) an enhanced financial statement risk assessment, (ii) the standardization of existing legal entity and newly implemented segment quarterly analytics and quarterly closing packages completed by key financial reporting personnel, (iii) a global account reconciliation review program and (iv) enhancements to our quarterly identification and reassessment of new and existing business and information technology risks that could affect our financial reporting. Monitoring is also performed through our enhanced quarterly controls certification process, whereby changes in business or information technology processes or control owners are identified and addressed timely. Although we have implemented and tested the additional controls as noted in our remediation plan and found them to be effective, this material weakness will not be considered remediated as of December 31, 2020 due to the Revenue – Price and Quantity material weakness, discussed below. Once the Revenue – Price and Quantity material weakness is remediated, we expect the Risk Assessment material weakness will also be remediated.

Revenue – Price and Quantity – Specific to the material weakness in our revenue process that was previously disclosed in ***"Item 9A. Controls and Procedures."*** in the Company's 2019 Form 10-K, we did not design and maintain effective controls over the review of pricing, quantity and customer data to verify that revenue recognized was complete and accurate. In order to remediate this material weakness, the Company has made significant progress in its redesign of certain aspects of its revenue process and related controls during 2020. As of the date of this report on Form 10-K, the Company has identified and agreed upon design enhancements and requirements for each revenue sub-process. The design includes enhancements to entity-level and transactional-level manual controls as well as IT general and application controls and the Company is in the process of implementing these design changes both centrally and locally. However, because the additional controls had not been implemented and tested as of December 31, 2020, this material weakness is not yet remediated. This existing material weakness will not be considered remediated until the applicable remedial controls operate for a sufficient period of time and management has concluded, through testing, that the controls are operating effectively.

Given the significant resources the Company has dedicated to remediation of its material weaknesses, the Company is committed to remediation and expects that in 2021 it will successfully implement the enhanced design of its revenue processes and have a sufficient operational effectiveness period to evidence material weakness remediation over its price and quantity material weakness and, concurrently, evidence material weakness remediation over its risk assessment material weakness in 2021 as well.

Changes in Internal Control Over Financial Reporting

As required by Rule 13a-15(d) under the Exchange Act, our management, including our principal executive officer and principal financial officer, has evaluated our internal control over financial reporting to determine whether any changes to our internal control over financial reporting occurred during the fourth quarter of the year ended December 31, 2020 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. Based on that evaluation, there were no changes that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting during the fourth quarter of the year ended December 31, 2020.

Item 9B. *Other Information.*

As previously reported by the Company on February 25, 2021, Michael F. Barry on February 24, 2021 informed the Board of Directors of the Company (the "Board") that he plans to retire as President and Chief Executive Officer of Quaker Houghton on December 31, 2021. Mr. Barry, who has been nominated for re-election as a director at the 2021 annual meeting of the Company's shareholders, is expected to serve his full three-year term as a director and will retain the role of Chairman of the Board following his retirement. The Board is committed to a strong, orderly process and transition with a comprehensive search that will include internal and external candidates.

PART III

Item 10. *Directors, Executive Officers and Corporate Governance.*

Incorporated by reference is (i) the information beginning with and including the caption "Proposal 1—Election of Directors and Nominee Biographies" in Quaker Houghton's definitive Proxy Statement relating to the 2021 Annual Meeting of Shareholders, to be filed with the Securities and Exchange Commission no later than 120 days after the close of its fiscal year ended December 31, 2020 (the "2021 Proxy Statement") to, but not including, the sub-caption "Governance Committee Procedures for Selecting Director Nominees," (ii) the information appearing in Item 4(a) of this Report, (iii) the information in the 2021 Proxy Statement beginning with and including the caption, "Delinquent Section 16(a) Reports" to, but not including, the caption "Certain Relationships and Related Transactions," (iv) the information in the 2021 Proxy Statement beginning with and including the sub-caption "Code of Conduct" to, but not including, the caption "Compensation Committee Interlocks and Insider Participation," and (v) the information in the 2021 Proxy Statement beginning with and including the sub-caption "Shareholder Nominations and Recommendations" to, but not including, the sub-caption "Board Oversight of Risk." Information about our Executive Officers is included in Item 4(a) of this Report.

Item 11. *Executive Compensation.*

Incorporated by reference is (i) the information in the 2021 Proxy Statement beginning with and including the caption "Compensation Committee Interlocks and Insider Participation" to, but not including the caption "Stock Ownership of Certain Beneficial Owners and Management."

Item 12. *Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.*

Incorporated by reference is the information in the 2021 Proxy Statement beginning with and including the caption "Stock Ownership of Certain Beneficial Owners and Management" to, but not including, the caption "Delinquent Section 16(a) Reports."

Equity Compensation Plans

The following table sets forth certain information relating to the Company's equity compensation plans as of December 31, 2020. Each number of securities reflected in the table is a reference to shares of Quaker common stock.

Equity Compensation Plan Information

Plan Category	**Number of securities to be issued upon exercise of outstanding options, warrants and rights**	**Weighted-average exercise price of outstanding options, warrants and rights**	**Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))**
	(a)	**(b)**	**(c)**
Equity compensation plans approved by security holders	110,336	$ 143.51	650,060 (1)
Equity compensation plans not approved by security holders	—	—	—
Total	110,336	$ 143.51	650,060 (1)

(1) As of December 31, 2020, 304,900 of these shares were available for issuance as restricted stock awards under the Company's 2001 Global Annual Incentive Plan, 283,508 shares were available for issuance upon the exercise of stock options and/or as restricted stock awards and/or restricted stock unit awards under the Company's 2016 Long-Term Performance Incentive Plan, and 61,652 shares were available for issuance under the 2013 Director Stock Ownership Plan.

Item 13. *Certain Relationships and Related Transactions, and Director Independence.*

Incorporated by reference is (i) the information in the 2021 Proxy Statement beginning with and including the caption "Certain Relationships and Related Party Transactions" to, but not including, the caption "Proposal 2 — Ratification of Appointment of Independent Registered Public Accounting Firm," (ii) the information in the 2021 Proxy Statement beginning with and including the sub-caption "Director Independence" to, but not including, the sub-caption "Governance Committee Procedures for Selecting Director Nominees," and (iii) the information in the 2021 Proxy Statement beginning with and including the caption "Meetings and Committees of the Board" to, but not including, the caption "Compensation Committee Interlocks and Insider Participation."

Item 14. *Principal Accountant Fees and Services.*

Incorporated by reference is the information in the 2021 Proxy Statement beginning with and including the sub-caption "Audit Fees" to, but not including, the statement recommending a vote for ratification of the appointment of PricewaterhouseCoopers LLP as the Company's independent registered public accounting firm for the year ending December 31, 2021.

PART IV

Item 15. ***Exhibits and Financial Statement Schedules.***

(a) Exhibits and Financial Statement Schedules

1. Financial Statements and Supplementary Data

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2. Financial Statement Schedules

All schedules are omitted because they are not applicable or the required information is shown in the financial statements or notes thereto. Financial statements of 50% or less owned companies have been omitted because none of the companies meets the criteria requiring inclusion of such statements.

3. Exhibits - filed pursuant to, and numbered in accordance with Item 601 of Regulation S-K (all of which are under Commission File number 001-12019, except as otherwise noted):

2.1 — Share Purchase Agreement, dated April 4, 2017, by and among Quaker Chemical Corporation, a Pennsylvania corporation, Gulf Houghton Lubricants, Ltd., an exempted company incorporated under the laws of the Cayman Islands, Global Houghton Ltd., an exempted company incorporated under the laws of the Cayman Islands, and certain members of the management of Global Houghton Ltd. and Gulf Houghton Lubricants, Ltd., as agent for the Sellers. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 8-K, filed on April 5, 2017. ***

3.1 — Amended and Restated Articles of Incorporation (as amended through July 24, 2019). Incorporated by reference to Exhibit 3.1 as filed by the Registrant with its quarterly report on Form 10-Q on August 1, 2019.

3.2 — Restated By-laws (effective May 6, 2015, as amended through March 27, 2020). Incorporated by reference to Exhibit 3.2 as filed by Registrant within its quarterly report on Form 10-Q on May 11, 2020.

4.1 — Registration Rights, dated August 1, 2019, issued to certain members of the management of Global Houghton Ltd. and Gulf Houghton Lubricants, Ltd. by Quaker Chemical Corporation. Incorporated by reference to Exhibit 4.5 as filed by Registrant on Form S-3 on August 29, 2019.

4.2 — Description of Quaker Houghton common stock. Incorporated by reference to Exhibit 4.2 as filed by the Registrant with Form 10-K for the year ended 2019.

4.3 — Convertible Note, Dated May 7, 2020, by and among Quaker Chemical Corporation, TEL Nordic Holdings ApS, and Lars Skogstad-Jensen. Incorporated by reference to Exhibit 4.3 as filed by Registrant on Form S-3 on May 19, 2020.

10.1 — Settlement Agreement and Release between Registrant, an inactive subsidiary of the Registrant, and Hartford Accident and Indemnity Company dated December 12, 2005. Incorporated by reference to Exhibit 10 (nnn) as filed by the Registrant with Form 10-K for the year 2005.

10.2 — Settlement Agreement and Release between Registrant, an inactive subsidiary of Registrant and Federal Insurance Company dated March 26, 2007. Incorporated by reference to Exhibit 10(zzz) as filed by the Registrant with Form 10-Q for the quarter ended March 31, 2007.

10.3 — Claim Handling and Funding Agreement between SB Decking, Inc., an inactive subsidiary of Registrant, and Employers Insurance Company of Wausau dated September 25, 2007. Incorporated by reference to Exhibit 10(ffff) as filed by the Registrant with Form 10-Q for the quarter ended September 30, 2007.

10.4 — Settlement Agreement and Mutual Release entered into between AC Products, Inc., wholly owned subsidiary of Registrant, and Orange County Water District, effective November 8, 2007. Incorporated by reference to Exhibit

10.47 as filed by the Registrant with Form 10-K for the year ended 2007.

10.5 — Employment Agreement by and between Registrant and Michael F. Barry dated July 1, 2008. Incorporated by reference to Exhibit 10.5 as filed by the Registrant with Form 10-Q for the quarter ended June 30, 2008. †

10.6 — Change in Control Agreement by and between Registrant and Michael F. Barry dated July 1, 2008. Incorporated by reference to Exhibit 10.6 as filed by the Registrant with Form 10-Q for the quarter ended June 30, 2008. †

10.7 — Employment Agreement by and between L. Willem Platzer and Quaker Chemical B.V., a Netherlands corporation and a subsidiary of Registrant, dated August 21, 2006. Incorporated by reference to Exhibit 10 as filed by the Registrant with Form 8-K filed on August 22, 2006. †

10.8 — Change in Control Agreement by and between Registrant and L. Willem Platzer dated April 2, 2007, effective January 1, 2007. Incorporated by reference to Exhibit 10(aaaa) as filed by the Registrant with Form 10-Q for the quarter ended March 31, 2007. †

10.9 — Memorandum of Employment by and between Registrant and Joseph Berquist dated April 1, 2010. Incorporated by reference to Exhibit 10.2 as filed by the Registrant with Form 10-Q for the quarter ended March 31, 2010. †

10.10 — Change in Control Agreement by and between Registrant and Joseph Berquist dated April 1, 2010. Incorporated by reference to Exhibit 10.3 as filed by the Registrant with Form 10-Q for the quarter ended March 31, 2010. †

10.11 — Employment Agreement by and between Dieter Laininger and Quaker Chemical B.V., a subsidiary of the registrant, dated June 1, 2011, effective June 15, 2011. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 10-Q for the quarter ended June 30, 2011. †

10.12 — Change in Control Agreement by and between Registrant and Dieter Laininger dated May 31, 2011, effective June 15, 2011. Incorporated by reference to Exhibit 10.2 as filed by the Registrant with Form 10-Q for the quarter ended June 30, 2011. †

10.13 — Expatriate Agreement by and between the Registrant and Dieter Laininger, dated September 27, 2017, effective August 1, 2019. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 10-Q, filed on November 12, 2019.†

10.14 — Expatriate Agreement by and between the Registrant and Adrian Steeples, dated October 12, 2017, effective August 1, 2019. Incorporated by reference to Exhibit 10.2 as filed by the Registrant with Form 10-Q, filed on November 12, 2019.†

10.15 — Form of Memorandum of Employment by and between the Registrant and certain executive officers (including Robert Traub, Jeewat Bijlani, Kym Johnson and David Slinkman). Incorporated by reference to Exhibit 10.3 as filed by the Registrant with Form 10-Q, filed on November 12, 2019.†

10.16 — Form of Change of Control Agreement by and between the Registrant and certain executive officers (including Robert Traub, Jeewat Bijlani, Kym Johnson and David Slinkman). Incorporated by reference to Exhibit 10.4 as filed by the Registrant with Form 10-Q, filed on November 12, 2019.†

10.17 — Memorandum of Employment by and between Registrant and Mary Dean Hall, dated and effective November 30, 2015. Incorporated by reference to Exhibit 10.60 as filed by the Registrant with Form 10-K for the year ended 2015.†

10.18 — Change in control agreement by and between Registrant and Mary Dean Hall, dated and effective November 30, 2015. Incorporated by reference to Exhibit 10.61 as filed by the Registrant with Form 10-K for the year ended 2015. †

10.19 — Terms and Conditions of Employment by and between Quaker Chemical Ltd and Adrian Steeples, dated December 7, 2010. Incorporated by reference to Exhibit 10.19 as filed by the Registrant with Form 10-K for the year ended 2019.†

10.20 — Amendment to Terms and Conditions of Employment by and between Quaker Chemical Ltd and Adrian Steeples, dated June 15, 2011. Incorporated by reference to Exhibit 10.20 as filed by the Registrant with Form 10-K for the year ended 2019. †

10.21 — Supplemental Retirement Income Program (as amended and restated effective January 1, 2008), approved November 19, 2008. Incorporated by reference to Exhibit 10.58 as filed by the Registrant with Form 10-K for the year ended 2008. †

10.22 — 2013 Director Stock Ownership Plan as approved May 8, 2013. Incorporated by reference to Appendix B to the Registrant's definitive proxy statement filed on March 28, 2013. †

10.23 — Retirement Savings Plan, as amended and restated effective January 1, 2016. Incorporated by reference to Exhibit 10.62 as filed by the Registrant with Form 10-K for the year ended 2015. †

10.24 — Global Annual Incentive Plan (as amended and restated effective February 24, 2016). Incorporated by reference to Appendix B to the Registrant's definitive proxy statement filed on March 28, 2016. †

10.25 — 2011 Long-Term Performance Incentive Plan. Incorporated by reference to Appendix C to the Registrant's definitive proxy statement filed on March 31, 2011 . †

10.26 — Form of Restricted Stock Unit Agreement for executive officers and other employees under Registrant's 2011 Long-Term Performance Incentive Plan. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 10-Q for the quarter ended March 31, 2012 . †

10.27 — 2016 Long-Term Performance Incentive Plan. Incorporated by reference to Appendix C to the Registrant's definitive proxy statement filed on March 28, 2016. †

10.28 — Form of Restricted Stock Award Agreement for executive officers and other employees under Registrant's 2016 Long-Term Performance Incentive Plan. Incorporated by reference to Exhibit 10.3 as filed by Registrant with Form 8-K filed on May 6, 2016. †

10.29 — Form of Restricted Stock Unit Agreement for executive officers and other employees under Registrant's 2016 Long-Term Performance Incentive Plan. Incorporated by reference to Exhibit 10.4 as filed by Registrant with Form 8-K filed on May 6, 2016. †

10.30 — Form of Stock Option Agreement for executive officers and other employees under Registrant's 2016 Long-Term Performance Incentive Plan. Incorporated by reference to Exhibit 10.30 as filed by the Registrant with Form 10-K for the year ended 2019. †

10.31 — Financing Agreement by and among Butler County Port Authority and Registrant and Brown Brothers Harriman & Co. dated May 15, 2008. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 10-Q for the quarter ended June 30, 2008.

10.32 — Butler County Port Authority Industrial Development Revenue Bond dated May 15, 2008. Incorporated by reference to Exhibit 10.7 as filed by the Registrant with Form 10-Q for the quarter ended June 30, 2008.

10.33 — Senior Secured Credit Facilities Commitment Letter, dated April 4, 2017, by and among Quaker Chemical Corporation, Bank of America, N.A., Merrill Lynch, Pierce, Fenner & Smith Incorporated, Deutsche Bank AG New York Branch and Deutsche Bank Securities Inc. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 8-K, filed on April 7, 2017.

10.34 — Credit Agreement, dated as of August 1, 2019, among Quaker Chemical Corporation and certain of its subsidiaries, Banks of America, N.A. and each of the lenders from time to time party thereto. Incorporated by reference to Exhibit 10.3 as filed by Registrant with Form 8-K filed on August 2, 2019. ***

10.35 — Amendment No. 1, dated as of March 17, 2020, to the Credit Agreement, dated as of August 1, 2019. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 8-K filed on March 17, 2020.

10.36 — Shareholder Agreement, dated August 1, 2019, among Quaker Chemical Corporation, Gulf Hungary Holding Korlátolt Felelősségű Társaság, Gulf Oil International, Ltd. and GOCL Corporation Limited. Inc. Incorporated by reference to Exhibit 10.1 as filed by Registrant with Form 8-K filed on August 2, 2019.

10.37 — Non-Competition and Non-Solicitation Agreement, dated as of August 1, 2019, among Quaker Chemical Corporation, Gulf Houghton Lubricants Ltd., Gulf Oil International, Ltd., GOCL Corporation Limited and Gulf Oil Lubricants India, Ltd. Incorporated by reference to Exhibit 10.2 as filed by Registrant with Form 8-K filed on August 2, 2019.***

10.38 — Escrow Agreement, dated August 1, 2019, among Quaker Chemical Corporation, Gulf Houghton Lubricants, Ltd. and Citibank N.A. Incorporated by reference to Exhibit 4.4 as filed by Registrant on Form S-3 on August 29, 2019.***

10.39 — Amendment No 1, effective March 1, 2020, to the Quaker Houghton Retirement Savings Plan. Incorporated by reference to Exhibit 10.2 as filed by the Registrant with its quarterly report on Form 10-Q on May 11, 2020. †

10.40 — Amendment No 2, effective February 10, 2020, to the Quaker Houghton Retirement Savings Plan. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with its quarterly report on Form 10-Q on August 5, 2020. †

10.41 — Amendment No 3, effective April 17, 2020, to the Quaker Houghton Retirement Savings Plan. Incorporated by reference to Exhibit 10.2 as filed by the Registrant with its quarterly report on Form 10-Q on August 5, 2020. †

21 — Subsidiaries and Affiliates of the Registrant.*

23 — Consent of Independent Registered Public Accounting Firm.*

31.1 — Certification of Chief Executive Officer of the Company pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934.*

31.2 — Certification of Chief Financial Officer of the Company pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934.*

32.1 — Certification of Michael F. Barry pursuant to 18 U.S.C. Section 1350.**

32.2 — Certification of Mary Dean Hall pursuant to 18 U.S.C. Section 1350.**

101.INS — Inline XBRL Instance Document*

101.SCH — Inline XBRL Taxonomy Extension Schema Document*

101.CAL — Inline XBRL Taxonomy Calculation Linkbase Document*

101.DEF — Inline XBRL Taxonomy Definition Linkbase Document*

101.LAB — Inline XBRL Taxonomy Label Linkbase Document*

101.PRE — Inline XBRL Taxonomy Presentation Linkbase Document*

104 — Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101.INS) *

* Filed herewith.
** Furnished herewith.
*** Certain exhibits and schedules have been omitted, and the Company agrees to furnish supplementally to the Securities and Exchange commission a copy of any omitted exhibits and schedules upon request.
† Management contract or compensatory plan

Item 16. *Form 10-K Summary.*

The Company has elected not to include a Form 10-K summary under this Item 16.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

QUAKER CHEMICAL CORPORATION
Registrant

By: /s/ MICHAEL F. BARRY

Michael F. Barry
Chairman of the Board, Chief Executive Officer and President

Date: March 1, 2021

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Signatures	Capacity	Date
/s/ MICHAEL F. BARRY **Michael F. Barry** **Chairman of the Board, Chief Executive Officer and President**	Principal Executive Officer and Director	March 1, 2021
/s/ MARY DEAN HALL **Mary Dean Hall** **Senior Vice President, Chief Financial Officer and Treasurer**	Principal Financial Officer	March 1, 2021
/s/ SHANE W. HOSTETTER **Shane W. Hostetter** **Vice President, Finance and Chief Accounting Officer**	Principal Accounting Officer	March 1, 2021
/s/ DONALD R. CALDWELL **Donald R. Caldwell**	Director	March 1, 2021
/s/ CHARLOTTE C. DECKER **Charlotte C. Decker**	Director	March 1, 2021
/s/ MARK A. DOUGLAS **Mark A. Douglas**	Director	March 1, 2021
/s/ JEFFRY D. FRISBY **Jeffry D. Frisby**	Director	March 1, 2021
/s/ WILLIAM H. OSBORNE **William H. Osborne**	Director	March 1, 2021
/s/ ROBERT H. ROCK **Robert H. Rock**	Director	March 1, 2021
/s/ FAY WEST **Fay West**	Director	March 1, 2021
/s/ SANJAY HINDUJA **Sanjay Hinduja**	Director	March 1, 2021
/s/ RAMASWAMI SESHASAYEE **Ramaswami Seshasayee**	Director	March 1, 2021
/s/ MICHAEL SHANNON **Michael Shannon**	Director	March 1, 2021

EXHIBIT 21

SUBSIDIARIES AND AFFILIATES OF THE REGISTRANT

Name	Jurisdiction of Incorporation	Percentage of Voting Securities Owned Directly or Indirectly by Quaker
*Quaker Chemical, S.A.	Argentina	100%
*Houghton Argentina S.A.	Argentina	100%
+*Quaker Australia Holdings Pty. Limited	Australia	100%
*Quaker Chemical (Australasia) Pty. Limited	Australia	100%
+*Houghton Australia Pty. Ltd.	Australia	100%
*Surface Technology Australia	Australia	100%
**Primex, Ltd.	Barbados	33%
+*Quaker Chemical Participacoes, Ltda.	Brazil	100%
*Quaker Chemical Industria e Comercio Ltda.	Brazil	100%
*Quaker Chemical Operacoes, Ltda.	Brazil	100%
*Ultraseal Asia Limited	British Virgin Islands	100%
*Quaker Chemical Canada Limited	Canada	100%
+*Quaker Chemical Canada Holdings, Inc.	Canada	100%
*Quaker Houghton Canada Inc. (formerly Lubricor, Inc.)	Canada	100%
*Houghton Canada Inc.	Canada	100%
+*Global Houghton Ltd.	Cayman Islands	100%
*Quaker Chemical (China) Co. Ltd.	China	100%
*Quaker Shanghai Trading Company Limited	China	100%
+*Quaker Chemical Investment Management (Shanghai) Co., Ltd.	China	100%
*Wuhan Quaker Technology Co., Ltd	China	60%
*Houghton (Shanghai) Specialty Industrial Fluids Co., Ltd	China	100%
*DA Stuart Shanghai Co	China	100%
*Ultraseal Chongqing Limited	China	100%
*Ultraseal Machinery Dongguan Ltd	China	100%
*Ultraseal Shanghai Limited	China	100%
*Houghton CZ s.r.o	Czech Republic	100%
+*Quaker Denmark ApS	Denmark	100%
*Houghton Denmark AS	Denmark	100%
*Tel Nordic ApS	Denmark	100%
*Houghton S.A.S.	France	100%
*SIFCO Concepts Sarl	France	100%
*Quaker Chemical Services EURL	France	100%
*Engineered Custom Lubricants GmbH	Germany	100%
*Houghton Deutschland GmbH	Germany	100%
*Ultraseal Germany GmbH	Germany	100%
*Internationale Metall Impragnier GmbH	Germany	100%
*Maldaner GmbH	Germany	100%
*Sterr & Eder Industrieservice GmbH	Germany	100%
*Quaker Chemical Limited	Hong Kong	100%
*Houghton Magyarország Kft	Hungary	100%
*Quaker Chemical India Private Limited	India	100%
*DA Stuart India Private Limited	India	100%
*Ultraseal India Private Ltd	India	30%

EXHIBIT 21

SUBSIDIARIES AND AFFILIATES OF THE REGISTRANT, *continued*

Name	Jurisdiction of Incorporation	Percentage of Voting Securities Owned Directly or Indirectly by Quaker
*Quaker Italia S.r.l.	Italy	100%
*Quaker Chemical S.r.l.	Italy	100%
*Houghton Italia S.p.A.	Italy	100%
*Houghton Japan Co., Ltd.	Japan	100%
**Nippon Quaker Chemical, Ltd.	Japan	50%
*Houghton Oil (Malaysia) Sdn, Bhd.	Malaysia	100%
+*Quaker Houghton (Finco) Ltd.	Malta	100%
+*Quaker Houghton Ltd.	Malta	100%
+*Quaker Houghton Holdings Ltd.	Malta	100%
+*Quaker Hougton Investments Limited	Malta	100%
*Tecniquimia Mexicana S.A. de C.V.	Mexico	100%
*Unitek Servicios De Asesoria Especializad S.A de C.V.	Mexico	100%
*Houghton Mexico S.A. de C.V.	Mexico	100%
*Lubricor Mexicana S.A. de C.V.	Mexico	100%
+*Quaker Chemical Europe B.V.	Netherlands	100%
*Quaker Chemical B.V.	Netherlands	100%
+*Quaker Russia B.V. (formerly KWR Holdings B.V.)	Netherlands	100%
+*Quaker China Holdings B.V.	Netherlands	100%
+*Houghton Europe BV	Netherlands	100%
*Houghton Benelux BV	Netherlands	100%
+*QH Europe BV	Netherlands	100%
*Quaker Sales Europe, BV	Netherlands	100%
**Kelko Quaker Chemical, S.A.	Panama	50%
*Houghton Polska Sp. Zo.o.	Poland	100%
+*Quaker Chemical Holdings South Africa (Pty) Limited	Republic of South Africa	100%
*Quaker Chemical South Africa (Pty.) Limited	Republic of South Africa	100%
*Houghton Romania S.R.L.	Romania	100%
+*GHI Asia Pacific Pte. Ltd.	Singapore	100%
*Houghton Singapore	Singapore	100%
**Korea Houghton Corporation	South Korea	50%
*Quaker Chemical, S.A.	Spain	100%
*Verkol S.A.U.	Spain	100%
+*Quaker Spain Holding, SLU	Spain	100%
*Houghton Iberica S.A.	Spain	100%
*Binol AB	Sweden	100%
*Houghton Sverige AB	Sweden	100%
*SIFCO Concepts Sweden	Sweden	100%
*Houghton Taiwan Co. Limited	Taiwan	100%
*Quaker (Thailand) Ltd.	Thailand	100%
*Quaker Houghton Thailand (formerly Thai Houghton 1993 Co., Ltd)	Thailand	100%
*Houghton Kimya Sanayi AS	Turkey	100%

EXHIBIT 21

SUBSIDIARIES AND AFFILIATES OF THE REGISTRANT, *continued*

Name	Jurisdiction of Incorporation	Percentage of Voting Securities Owned Directly or Indirectly by Quaker
*Quaker Chemical Corporation	U.S.A.	100%
+*SB Decking, Inc. (formerly Selby, Battersby & Co.)	U.S.A.	100%
*AC Products, Inc.	U.S.A.	100%
*Epmar Corporation	U.S.A.	100%
*Summit Lubricants, Inc.	U.S.A.	100%
*ECLI Products, LLC	U.S.A.	100%
+*EFHCO, LLC	U.S.A.	100%
+*GH Holdings Inc.	U.S.A.	100%
+*Houghton Technical Corp.	U.S.A.	100%
*SIFCO Applied Surface Concepts, LLC	U.S.A.	100%
*Quaker Houghton PA, Inc. (formerly Houghton International)	U.S.A.	100%
*Ultraseal USA Inc.	U.S.A.	100%
+*Wallover Enterprises, Inc.	U.S.A.	100%
*Wallover Oil Company Incorporated	U.S.A.	100%
*Wallover Oil Hamilton Inc.	U.S.A.	100%
+*Quaker International Holdings, LLC	U.S.A.	100%
+*MIH Acquisition Company, LLC	U.S.A.	100%
*Coral Chemical Company, LLC	U.S.A.	100%
*Houghton Ukraine ToV	Ukraine	100%
*Quaker Chemical Limited	United Kingdom	100%
+*GHGL London Ltd.	United Kingdom	100%
+*GHG Lubricants Holdings Limited	United Kingdom	100%
+*Houghton Holdings Limited	United Kingdom	100%
*Houghton Limited (formerly Houghton plc)	United Kingdom	100%
+*Applied Surface Concepts Holdings Ltd.	United Kingdom	100%
*Norman Hay Engineering Ltd.	United Kingdom	100%
*SIFCO Applied Surface Concepts (UK) Ltd	United Kingdom	100%
*Surface Technology Holdings Ltd.	United Kingdom	100%
*Surface Technology (Leeds) Ltd	United Kingdom	100%
*Surface Technology Aberdeen Ltd	United Kingdom	100%
*Surface Technology (East Kilbride) Ltd.	United Kingdom	100%
*Surface Technology (Coventry) Ltd	United Kingdom	100%
*Ultraseal International Group Ltd	United Kingdom	100%
*MX Systems International Ltd	United Kingdom	100%
+*Quaker Houghton International LP	United Kingdom	100%
+*Quaker Houghton Holdings Limited	United Kingdom	100%
+*QH Holdings Limited	United Kingdom	100%
+*QH Chemical Limited	United Kingdom	100%
+*QH International Limited	United Kingdom	100%
+*Quaker Specialty Chemicals (UK) Limited	United Kingdom	100%
*Quaker Houghton Support Deutschland	United Kingdom	100%
Kelko Quaker Chemical, S.A.	Venezuela	50%

+A non-operating company

*Included in the consolidated financial statements

**Accounted for in the consolidated financial statements under the equity method

EXHIBIT 23

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Forms S-3 (Registration Nos. 333-155607, 333-233530, 333-233956 and 333-238508) and on Forms S-8 (Registration Nos. 033-54158, 333-58676, 333-115713, 333-159513, 333-174145, 333-208188, 333-188594 and 333-211238) of Quaker Chemical Corporation of our report dated March 1, 2021 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Philadelphia, Pennsylvania
March 1, 2021

EXHIBIT 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER OF THE COMPANY PURSUANT TO RULE 13a-14(a) OF THE SECURITIES EXCHANGE ACT OF 1934

I, Michael F. Barry, certify that:

1. I have reviewed this Annual Report on Form 10-K of Quaker Chemical Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: March 1, 2021

/s/ MICHAEL F. BARRY
Michael F. Barry
Chief Executive Officer

EXHIBIT 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER OF THE COMPANY PURSUANT TO RULE 13a-14(a) OF THE SECURITIES EXCHANGE ACT OF 1934

I, Mary Dean Hall, certify that:

1. I have reviewed this Annual Report on Form 10-K of Quaker Chemical Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: March 1, 2021

/s/ MARY DEAN HALL

Mary Dean Hall

Chief Financial Officer

EXHIBIT 32.1

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350

The undersigned hereby certifies that the Form 10-K Annual Report of Quaker Chemical Corporation (the “Company”) for the annual period ended December 31, 2020 filed with the Securities and Exchange Commission (the “Report”) fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: March 1, 2021

/s/ MICHAEL F. BARRY

Michael F. Barry

Chief Executive Officer of Quaker Chemical Corporation

EXHIBIT 32.2

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350

The undersigned hereby certifies that the Form 10-K Annual Report of Quaker Chemical Corporation (the "Company") for the annual period ended December 31, 2020 filed with the Securities and Exchange Commission (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: March 1, 2021

/s/ MARY DEAN HALL

Mary Dean Hall

Chief Financial Officer of Quaker Chemical Corporation