QUAKER HOUGHTON:

WE'RE JUST GETTING **STARTED.**

2021 ANNUAL REPORT

ABOUT QUAKER HOUGHTON

Quaker Houghton is the global leader in industrial process fluids to the primary metals and metalworking markets. We help the world's manufacturers by continually improving their operations and their bottom line. The company was formed on August 1, 2019, through the combination of the rich history, expertise and customer-focused business models of Quaker Chemical and Houghton International. Find out more at: **www.quakerhoughton.com.**

WE'RE JUST GETTING **STARTED.**

We've built a solid foundation for sustained growth. Our success can be traced to the singularity of our focus—delivering value to customers. This business model has helped us grow at rates above those of the markets we serve. But we are just getting started. We're resilient, strong and determined. We've never been more prepared to maximize opportunities and generate shareholder value.

WE'VE NEVER BEEN MORE PREPARED:

TO UNLOCK THE **POWER** OF OUR EXPERTISE.

WE'RE HARNESSING KNOWLEDGE ON AN UNPRECEDENTED SCALE. Nothing is more critical to our success than the collective knowledge of our people. We've assembled the best talent in the industry and built a culture that values collaboration. The result is, we're meeting customers' evolving needs and moving our company's vision forward. At this moment, dedicated teams are working on projects designed to run our business more efficiently, serve our customers better, stay ahead of market trends and reduce our impact on the planet.

To enhance our knowledge-sharing platform, we unified our Customer Relationship Management (CRM) programs into one robust system and began integrating all our Enterprise Resource Planning (ERP) programs worldwide. We've transitioned much of our revenue onto the ERP platform, and it's beginning to transform the way we work. More automation and data analytics free us to focus on what matters most to our customers.

With our combination in 2019 and subsequent acquisitions, we've nearly doubled our R&D and customer-facing resources and created a platform to unlock the power of our global R&D capabilities. The scale and the diversity of ideas we've gained are accelerating our innovation—in next-generation formulations, digitization and green chemistry. And by sharing knowledge globally, we have created seamless access to specialized industry expertise, reducing duplication of work and speeding new solutions to market.

The power of our collective knowledge helped us tackle disruptions caused by the pandemic. We drew heavily on expertise from across our value chain to reduce the impact on customers. Our people forged new connections and learned to capitalize on each other's achievements. These gains will have a lasting effect on our ability to address future challenges.

2.5%

of revenue was spent on R&D in 2021

WE'VE NEVER BEEN MORE PREPARED:

TO TAP OPPORTUNITIES FOR **GROWTH.**

WE'RE DRIVING STRATEGIES TO CAPTURE SUSTAINABLE GROWTH. Despite market disruptions during the past two years, we continue to grow faster than the markets we serve. By capitalizing on the strength of past investments, we're growing within our traditional markets and expanding into new areas.

To build critical mass in key segments, we've expanded our technology offerings—closing gaps strategically—to broaden our reach within our customers' plants. For example, in steel cold rolling, where we've long supplied lubricants, we are now supplying fluids for plating and passivation. Similarly, in metalworking, our expanded portfolio allows us to cross-sell to existing customers. A more complete portfolio increases our opportunities with each customer and deepens loyalty to our brand. Our addressable metalworking market is large and growing which means that there are many more opportunities ahead for us.

We're harnessing our expertise to tap growing market trends. The innovative methods used in electric vehicle manufacturing require precision lubricant application. Because our lubrication systems have proven to be a successful solution, customers are installing more of our equipment—and this means more opportunities for us. In addition, the aluminum container industry, where we purpose-built a complete portfolio, is providing us with strong growth. The market is expanding rapidly due to an increased demand for at-home beverages during the pandemic and an increase in the use of aluminum in containers to replace less-recyclable materials.

We continue to invest in organic growth opportunities and further enhance our growth profile with strategic acquisitions that augment our capabilities. In 2021, we completed five acquisitions that expand our geographic footprint and technologies, enabling us to better serve our customers.

24%

net sales growth
achieved in 2021

WE'VE NEVER BEEN MORE PREPARED:

TO HELP **CUSTOMERS** REACH GOALS.

WE'RE STAYING AHEAD OF INDUSTRY ADVANCEMENTS AND MARKET TRENDS. The impetus to continuously improve customers' operations is deeply ingrained in us. Our business model, based on customer intimacy, enables us to understand and deliver exactly what each customer needs to achieve their goals.

A large part of our work in R&D is dedicated to doing just that—helping customers with everyday challenges. For example, a global automotive manufacturer wanted to reduce their carbon footprint without sacrificing production speed or quality. Our team saw an opportunity for energy savings in their cleaning process, which required heat to function correctly. By developing a cleaner that works effectively at ambient temperatures, we reduced their energy use substantially.

We operate three Centers of Innovation (COI) with teams focused on forward-looking strategic projects. Through their efforts, we are helping customers benefit from advancements in manufacturing and Industry 4.0 technologies. Our digitized fluid systems are helping manufacturers improve performance by controlling fluid parameters with greater precision. These tightly controlled systems enable processes to run more profitably and with less environmental impact. Looking ahead, we are building more automation into our equipment that will enable customers to leverage big data and analytics anytime, anywhere.

For our electric vehicle customers, we've made advancements that improve the casting and machining of new alloys. For example, our die-release lubricants and systems optimize high-pressure casting for aluminum. And our specialized lubrication technology helps overcome the challenges of rolling electrical steel, a type of alloy with magnetic properties needed for electric motors. With our customer-intimate approach, we are well positioned for whatever customers will need next.

30%

of R&D focuses on next-gen innovation

WE'VE NEVER BEEN MORE PREPARED:

TO DRIVE OUR **VALUES** INTO OUR WORK.

WE'RE MOBILIZING GLOBALLY TO FULFILL OUR VISION FOR SUSTAINABILITY. In 2020, we established a renewed vision for sustainability. We now have a program to support the long-term aspirational goals and short-term milestones for topics identified in a comprehensive materiality assessment. We've created and funded a robust organization to mobilize our goals—Board and executive-level committees, dedicated specialists, and project teams aligned with each of our four focus areas. As of January 2022, our sustainability efforts are being led by our Chief Strategy Officer. This ensures that sustainability is closely tied to our business strategy.

In 2021, we continued to improve the efficiency of our facilities, taking foundational steps toward becoming carbon neutral in our operations by 2030 and net-zero by 2050 across our value chain. And we are making our portfolio safer and more environmentally friendly. Our goal is to achieve 100% of finished goods in our portfolio not classified as confirmed Category 1 CMR (carcinogenic, mutagenic or reprotoxic) hazards and to significantly reduce our fossil-based raw materials by 2030. To further enhance safety protocols, we moved to a state-of-the art system for authoring safety data sheets (SDS) and printing labels. By implementing this harmonized system across Quaker Houghton, we can better communicate hazard profiles, safety precautions and other important product information in accordance with complex regulations that can vary by country.

To protect our people, we're building a global culture of safety. *Live Safe* is one of our core values. Since 2019, we've invested in industry-leading health and safety programs, and we've implemented robust outreach campaigns that are easy to understand and act on. The results have been good. In 2021, our reportable incidents were less than half those in 2019. We continue to work toward our ideal goal: zero incidents of serious injury recordables worldwide.

2030

is our goal for
carbon neutrality

A MESSAGE FROM ANDREW E. TOMETICH CHIEF EXECUTIVE OFFICER AND PRESIDENT

Dear Shareholders, Customers and Colleagues:
It's an honor to be here at Quaker Houghton and I'm excited by the opportunities ahead. Since taking over as CEO and President on December 1, 2021, I've spent time getting to know our people and operations and introducing myself to many of our shareholders. I'm grateful to the Executive Leadership Team and all my new colleagues who have welcomed me.

I appreciate the trust that the Board has placed in me and look forward to the opportunity to work with them and reward their confidence. I would especially like to thank Mike Barry for his support during our transition. During his 23 years of leadership, 13 as CEO, our shareholders, customers and colleagues were fortunate to have his guidance. And now, we will all continue to benefit from his contributions as Chairman of the Board of Directors.

Although I am still relatively new to the company, I already feel very much at home here at Quaker Houghton. I wholeheartedly believe in the company's core values and customer-intimate strategy. These are clear differentiators that make the company strong and resilient and a valuable growth engine. We will build upon this solid foundation.

With our global values-based culture, industry-leading expertise and drive to embrace new capabilities needed to deliver on our strategy, we are well positioned for the future. Our journey to the next level of profitable growth is truly just beginning.

We delivered a strong performance despite global headwinds. 2021 was a very challenging business environment all around the world. Despite the market disruptions caused by the pandemic, demand for our solutions and services remained robust. For the full year, net sales and adjusted EBITDA reached record highs and many other financial metrics were strong.

Since our combination in 2019, we have successfully reset our financial capabilities including our annual top- and bottom-line performance, our financial position and our overall ability to grow. We have fully captured the $80 million in cost synergies we had forecasted and delivered the step change in our bottom-line financial results that we had initially projected. Our cash flow remains strong, and our balance sheet is healthy. We have also maintained our ongoing commitment to our shareholders by marking our 50th consecutive year of maintaining or increasing our dividend.

We made progress on strategic initiatives. Throughout the year, no matter the challenges, our team never lost sight of initiatives and opportunities that were central to our success—and to the success of our customers. We continued to augment our portfolio through innovation and acquisitions, deepened our customer relationships, advanced our sustainability program and invested in strategic initiatives to identify and support growth.

› *We began a global strategic planning process focused on customer value.* Through this effort, we continue to review and renew strategic growth options and priorities. Once complete, all our businesses, functions, regions and channels will be designed in alignment with, and support the achievement of, our global customer-intimate strategies and plans for future growth.

› *We advanced system integration and digitization to benefit customers***.** Work on integrating and improving our Enterprise Resource Planning (ERP) systems continued in 2021. We have transitioned much of our revenue onto a single platform. Enhancements in 2022 will add further automation and begin to transform our work—freeing up time for what matters most to our customers.

"Our brand's bedrock is and will remain customer intimacy."

› *We made progress on sustainable talent development.* We invested in expertise development across the company to ensure that we continue to advance our strategy and strengthen our culture. New hires included colleagues specializing in learning and development and diversity and inclusion. Through individualized development plans, we are working to develop people and advance them through the organization.

Our priorities going forward are clear. In these early days of being CEO, I want to provide you with my preliminary thoughts on where I see opportunities that we can build upon going forward. With our legacy, talent and drive, we are well positioned to help customers in their ever-evolving world.

› *Our brand's bedrock is and will remain customer intimacy.* For decades, our customer-intimate strategy has served our customers, shareholders and company well. It differentiates us, brings us insights and opportunities, and gives us resiliency during challenging times. That's why we will continue to strengthen our capabilities and align our global expertise around customers' future needs.

› *We will deliver profitable growth.* Our company has a long track record of delivering above-market growth through steady organic market increases and successfully leveraging acquisitions that enhance our solutions and reinforce customer intimacy. We will continue to use our strong cash flow and financial flexibility to invest in innovation and acquisitions that add value for customers and improve total shareholder return.

In addition, by embracing a continuous improvement mindset, we will upgrade our portfolio, priorities and processes. This will include building our digital interface capabilities so that we can achieve greater customer intimacy and enhance profitability and productivity.

› *We will accelerate investments in sustainability valued by customers and society.* Our vision for sustainability is to create social, environmental and economic progress while helping our customers do the same. To advance our aspirations, we established comprehensive sustainability goals and a program that is led by our Chief Strategy Officer. Going forward, we will ensure that our sustainability investments are closely tied to all we do.

Our goals are based on four sustainability pillars—*Innovating Together for a Better Tomorrow, Protecting Our Planet, Empowering Our Colleagues and Communities,* and *Sourcing Our Materials Responsibly*. For each pillar, we have mobilized project teams to build action plans designed to help us achieve our 2030 commitments.

In early 2022, we were recognized by *Newsweek* as one of America's Most Responsible Companies. This award reaffirms that we are on the right path thanks to the great efforts of our global team.

A MESSAGE FROM ANDREW E. TOMETICH CHIEF EXECUTIVE OFFICER AND PRESIDENT

› *We will continue to advance our values-based culture.* Our goal is to continuously strengthen our culture to create a healthy and engaged workplace. We have already activated internal teams, provided manager training, monitored engagement and added dedicated resources for talent development and diversity and inclusion. To broaden access to training, we will continue investing in an extensive library for e-learning. Consistent with our values, we will actively consider and promote diversity, equity and inclusion in all major decisions.

We will also continue to invest in building a culture of safety and wellness. Our proactive efforts will continue as a top priority, but I'm also happy to report that the resulting number of our reportable incidents has already been cut in half since 2019, which places us near the top quartile of ratings as measured by the American Chemistry Council.

I'm very proud of our people. Guided by our values, our accomplishments this past year were truly remarkable. Colleagues showed themselves to be resilient, agile and unstoppable when it came to keeping our customers' operations running. Through our collective actions, the company prospered, created value for shareholders and helped make the world a better place. On behalf of myself and the entire Executive Leadership Team, we thank everyone for their dedication and tireless efforts.

Our future is bright. 2022 will be another strong year for us. Quaker Houghton is already a leading global enterprise with the talent, resources and drive to improve the world in which we all live. Two years ago, the company doubled in size, and since then we have been focused on coming together to secure a strong, singular foundation based on customer intimacy.

> **"Our future is bright. We're just getting started!"**

We have a great opportunity ahead to build upon that bedrock, maximize the benefits of our scale, globalize our capabilities, digitize our connectedness and build sustainability into the fabric of all that we do. As we move forward together, we will invest in and transform Quaker Houghton to achieve new levels of success.

Our future is bright. We're just getting started!

Best Regards,

Andy Tometich

Andrew E. Tometich
Chief Executive Officer and President

Mike Barry retired as President and CEO on November 30, 2021. He served the company for 23 years, first as CFO and part of the leadership team and for the last 13 years as Chairman, President and CEO. He remains the Chairman of our Board.

A TRIBUTE TO MIKE

Under Mike's leadership, our company thrived. The core principles of his leadership and the culture he fostered will continue to serve us for years to come.

During his tenure, the company surpassed all performance records—and then broke those records again the next year. Our revenue grew from $451 million in 2009 to $1.8 billion in 2021. And the company has returned significant value to our shareholders. Our total shareholder return increased 1,338% during Mike's time as CEO.

Under Mike's leadership, we completed 27 strategic acquisitions diversifying our markets and building critical mass in many. Most notably, Mike led us through the combination of Quaker Chemical with Houghton International in August 2019, which doubled our revenues, talent and size and further diversified the markets available to us. These acquisitions and the combination have built a solid foundation from which we can prosper and grow.

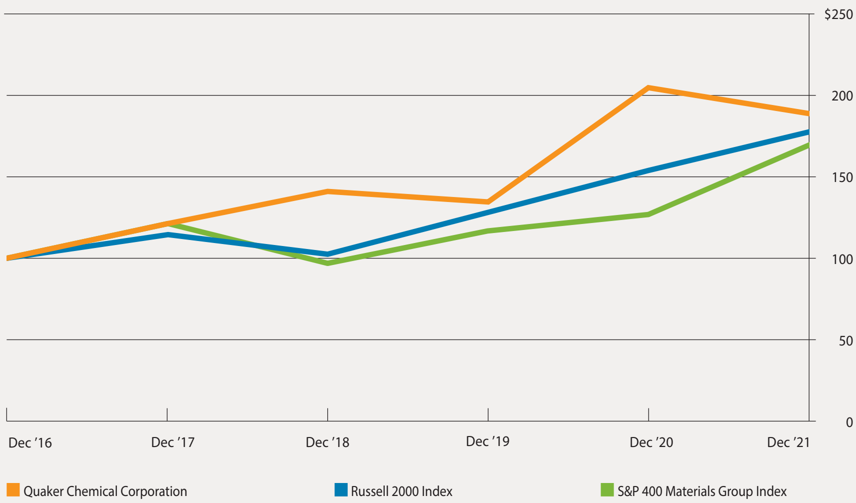
Thank you, Mike, for your guidance, leadership and accomplishments over the years.

—The Executive Leadership Team

2021 FINANCIAL HIGHLIGHTS

Comparison of Cumulative Five-Year Total Return

(assumes an investment of $100 on December 31, 2016)



Over the last five years, Quaker Houghton has delivered approximately 88% total shareholder return—exceeding relevant stock market indices.

50 YEARS

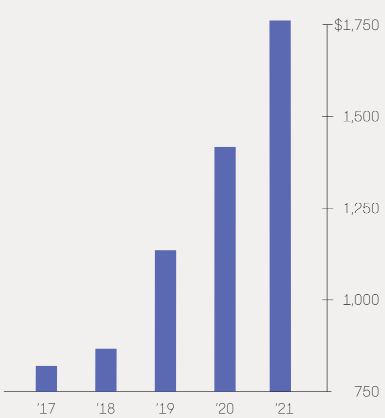
Quaker Houghton has increased or maintained its dividend every year since going public in 1972.

$80 MILLION

Ongoing synergies achieved related to the combination.

Revenue Trend

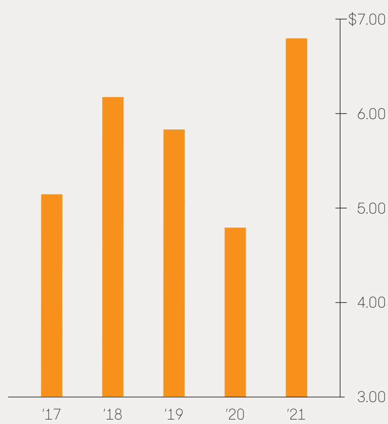
(dollars in millions)



Revenues grew 24% in 2021 despite challenges in the global marketplace.

Non-GAAP Earnings Per Diluted Share*

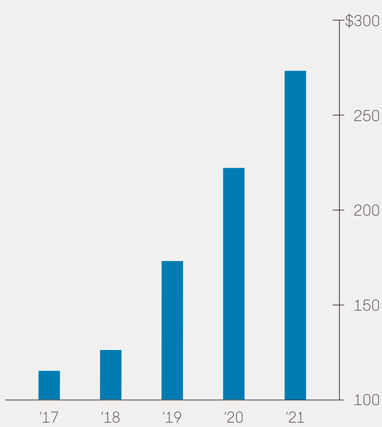
(share price in dollars)



Non-GAAP earnings per diluted share were $6.85 in 2021 compared to $4.78 in 2020.

Adjusted EBITDA**

(dollars in millions)



Our adjusted EBITDA grew 23% to $274.1 million in 2021 compared to $222.0 million in 2020.

* Our non-GAAP earnings per diluted share reflect the increase to the company's share count resulting from the closing of the combination on August 1, 2019. See the Non-GAAP Measures section in item 7 of the 2021 Form 10K.

** Our adjusted EBITDA reflects a full year of the combined company for 2020 and 2021 compared to legacy Quaker plus five months of Houghton's operations post-closing of the combination for 2019.

SHAREHOLDER INFORMATION

Independent Registered Public Accounting Firm
PricewaterhouseCoopers LLP
Two Commerce Square
2001 Market Street, Suite 1800
Philadelphia, Pennsylvania 19103-7042

Stock Transfer Agent
For address changes, dividend checks, lost stock certificates, share ownership and other administrative services, contact: American Stock Transfer & Trust Company, LLC, 6201 15th Avenue, Brooklyn, New York 11219. Phone: 1-800-937-5449; website: www.astfinancial.com.

Investor Relations
Security analysts, portfolio managers and representatives of financial institutions seeking information about the Company are invited to contact: Jeffrey Schnell, Senior Director, Investor Relations, at 610-832-4087.

Copies of the Company's Annual Report on Form 10-K and other corporate filings will be provided without charge upon request by contacting: Jeffrey Schnell, Senior Director, Investor Relations, at 610-832-4087 or via email to investor@quakerhoughton.com.

We also invite you to visit the Investor Relations section of our website, www.quakerhoughton.com, for expanded information about the Company and to view an online version of our annual report.

Annual Meeting
The Annual Meeting of Shareholders will be held live via the Internet at www.virtualshareholdermeeting.com/KWR2022 on May 11, 2022 at 8:00 a.m., Eastern Time.

Dividend Reinvestment and Stock Purchase Plan
Quaker Houghton's Dividend Reinvestment and Stock Purchase Plan offers shareholders a convenient and economical way to purchase additional Quaker Houghton Common Shares through the reinvestment of dividends and/or voluntary cash contributions without commissions or transaction fees. For further information concerning the Plan, contact American Stock Transfer & Trust Company, LLC, at 1-877-724-6458.

Quaker Houghton Quarterly Stock Information
The following table sets forth, for the calendar quarters during the past two years, the range of high and low sales prices for the common stock as reported on the NYSE (amounts rounded to the nearest penny) and the quarterly dividends paid:

	2021		2020		Dividends Paid	
	High	Low	High	Low	2021	2020
First Quarter	$301.99	$226.74	$189.03	$113.94	$ 0.395	$0.385
Second Quarter	249.30	227.24	199.61	108.14	0.395	0.385
Third Quarter	263.83	223.19	208.26	170.31	0.395	0.385
Fourth Quarter	276.60	215.86	272.31	176.65	0.415	0.395

As of January 17, 2022, there were 649 shareholders of record of Quaker Houghton's common stock, $1.00 par value, its only outstanding class of equity securities. This number does not include shareholders whose shares were held in nominee name.

KWR
LISTED
NYSE

QUAKER HOUGHTON LEADERSHIP

Andrew E. Tometich
Chief Executive Officer and President

Joseph A. Berquist
Executive Vice President, Chief Strategy Officer, Managing Director—Global Specialty Businesses

Jeewat Bijlani
Senior Vice President, Managing Director—Americas

Shane W. Hostetter
Senior Vice President, Chief Financial Officer

Kym Johnson
Senior Vice President, Chief Human Resources Officer

Directors

Michael F. Barry
Chairman of the Board, Chief Executive Officer and President (until November 30, 2021)

Donald R. Caldwell (1,2)
Chairman and Chief Executive Officer, Cross Atlantic Capital Partners, Inc., a venture capital management company

Charlotte C. Decker (1)
Former Chief Information Technology Officer, UAW Retiree Medical Benefits Trust, the largest non-governmental purchaser of retiree health care in the United States

Mark A. Douglas (3,4)
President and Chief Executive Officer, FMC Corporation, an agricultural sciences company; Governance Committee Chair

Jeffry D. Frisby (1,4)
Executive Chairman, PCX Aerostructures, LLC, a leading provider of flight critical mechanical systems and components for rotorcraft and fixed wing aerospace platforms; Sustainability Committee Chair

Sanjay Hinduja (3)
Chairman, Gulf Oil International Limited, a lubricant business offering a huge array of products and services in more than 100 countries around the world

William H. Osborne (2,4)
Senior Vice President of Operations and Total Quality, The Boeing Company, the world's largest aerospace company and a leading manufacturer of commercial jetliners and defense, space and security systems

Robert H. Rock (2,3)
Chairman, MLR Holdings, LLC, an investment company operating in the publishing and information industry; Compensation and Human Resources Committee Chair

Ramaswami Seshasayee (1,2)
Former Managing Director and Chief Executive Officer, Ashok Leyland Limited, India, a company reported to be the second largest manufacturer of commercial vehicles in India, the fourth largest manufacturer of buses in the world and the twelfth largest manufacturer of trucks

Committees of the Board: (1)Audit; (2)Compensation and Human Resources Committee; (3)Governance Committee; (4)Sustainability Committee

Dieter Laininger
Senior Vice President,
Managing Director—
Asia Pacific

Wilbert Platzer
Senior Vice President,
Global Operations,
EHS and Procurement

Dr. David Slinkman
Senior Vice President,
Chief Technology
Officer

Adrian Steeples
Senior Vice President,
Managing Director—
EMEA

Robert T. Traub
Senior Vice President,
General Counsel and
Corporate Secretary

Michael J. Shannon [4]
Former Chief Executive Officer, Houghton International Inc., a global leader in delivering advanced metalworking fluids and services for the automotive, aerospace, metals, mining, machinery, offshore and beverage industries

Andrew E. Tometich
Chief Executive Officer and President (since December 1, 2021)

Fay West [1,3]
Senior Vice President and Chief Financial Officer, Tennant Company, a world leader in the design, manufacture and marketing of solutions that help create a cleaner, safer, healthier world; Audit Committee Chair

Chairmen Emeriti

Peter A. Benoliel
Former Chairman of the Board and Chief Executive Officer of the Company

Ronald J. Naples
Former Chairman of the Board and Chief Executive Officer of the Company

Officers

Andrew E. Tometich
Chief Executive Officer and President (since December 1, 2021)

Joseph A. Berquist
Executive Vice President, Chief Strategy Officer, Managing Director—Global Specialty Businesses

Jeewat Bijlani
Senior Vice President, Managing Director—Americas

Shane W. Hostetter
Senior Vice President, Chief Financial Officer (since April 19, 2021)

Kym Johnson
Senior Vice President, Chief Human Resources Officer (until February 14, 2022)

Dieter Laininger
Senior Vice President, Managing Director—Asia Pacific

Wilbert Platzer
Senior Vice President, Global Operations, EHS and Procurement

Dr. David Slinkman
Senior Vice President, Chief Technology Officer

Adrian Steeples
Senior Vice President, Managing Director—EMEA

Robert T. Traub
Senior Vice President, General Counsel and Corporate Secretary

Leadership presented is reflective of December 31, 2021.

Officers are presented in alphabetical order with the exception of the CEO.

OUR **CULTURE** DRIVES US FORWARD.

OUR PEOPLE RESPONDED WITH THE RESOLVE TO DO WHAT'S RIGHT FOR OUR CUSTOMERS AND OUR COMPANY. While facing the many challenges 2021 presented, our people showed themselves to be resilient, agile and tenacious. Despite raw material shortages and supply chain disruption, we kept our products flowing to our customers. Everyone, everywhere in the world, brought their unique capabilities and energy to the table. What's more, our people stayed the course on business initiatives—helping us achieve profitable growth, advance important projects and capitalize on new opportunities. As a company, in 2021, we took steps to further strengthen our culture. We activated internal teams, trained managers, monitored engagement and added dedicated resources for talent development. Together, we are striving to build a company where everyone can thrive.

In 2021, we mobilized project teams to work towards sustainability goals in four focus areas. Below are highlights of our aspirations.

SUSTAINABILITY GOALS FOR 2030

INNOVATING TOGETHER FOR A BETTER TOMORROW

PRODUCT SAFETY

100%

Of finished goods not classified as confirmed Category 1 CMR (carcinogenic, mutagenic or reprotoxic) hazards

RAW MATERIALS

30%

Reduction of fossil-based raw materials

WASTE REDUCTION

45

Thousand metric tons of waste eliminated from our FLUIDCARE® partner facilities

PROTECTING OUR PLANET

CARBON NEUTRALITY

2030

Our global operations will be carbon neutral

GREENHOUSE GAS

Set science-based targets for achieving net zero emissions across our value chain

WASTE TO LANDFILL, HAZARDOUS WASTE & WATER/TON PRODUCED

20%

Reduction of each

EMPOWERING OUR COLLEAGUES & COMMUNITIES

SAFETY RECORD

0

Serious injury recordables each year

DIVERSITY

25+%

Female representation globally; and in the US in management/ethnic diversity

CAREER ENHANCEMENT

100%

Of our colleagues have access to career enhancement programs

VOLUNTEERING

250

Thousand cumulative hours

SOURCING OUR MATERIALS RESPONSIBLY

SUPPLIER EXCELLENCE

75%

Of our total direct spend with suppliers that exceed our sustainability performance threshold

For more information on our program, progress and disclosure, visit www.quakerhoughton.com/sustainability

OUR CORE VALUES

PRINCIPLES

Live safe.
Act with integrity.

PERFORMANCE

Exceed customer expectations.
Drive results.

PEOPLE

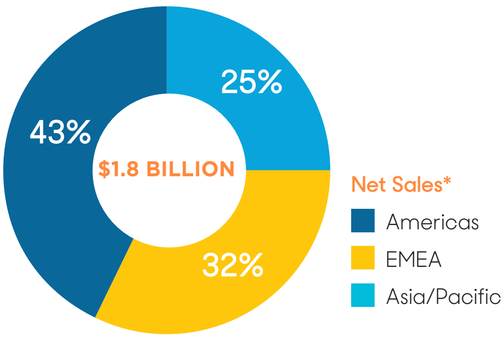
Embrace diversity.
Do great things together.

When your values are clear, hard decisions become easy. Our *Core Values* define what kind of company we want to be, how we treat each other and what we share.

QUAKER HOUGHTON AT-A-GLANCE

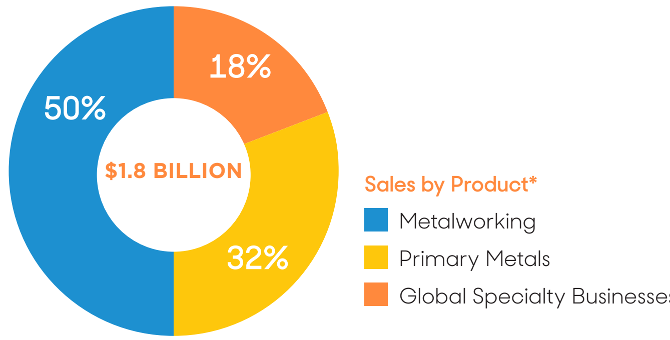
Expanded Global Presence

We now sell our product technologies in more than 109 countries to a diverse base of customers. Quaker Houghton has an increasingly broad geographic distribution of revenues.



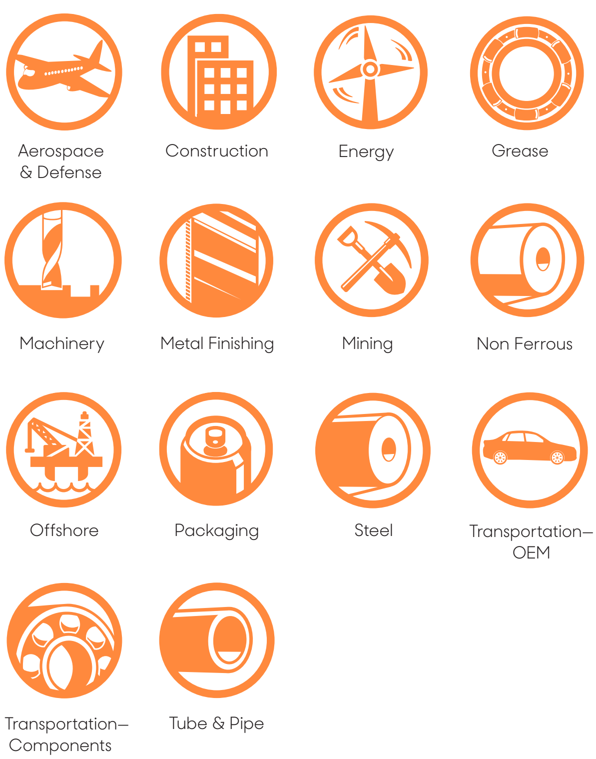
Diversified Product Technologies

We have added breadth and depth to our product portfolio through the combination of Quaker and Houghton and our more than 20 strategic acquisitions in the past 10 years.



Industries We Serve

Our customers produce the steel, aluminum, cars, aircraft, machinery and industrial parts that make the global economy move, prosper and grow—from large manufacturers to specialty machining shops.



Representative Product Lines

Our industrial process fluid solutions ensure peak performance, reduce total cost of ownership, boost productivity and drive competitiveness. Our products and our people are critical to the success of our clients—and to the smooth operation of the world's manufacturing economy. Here are a few product lines that deliver value to our customers:

Rolling oils provide roll protection, eliminate defects and save energy for the world's largest and most advanced steel and aluminum mills.

Metalworking fluids enable sophisticated machining processes for the world's largest automotive and aerospace manufacturing companies.

Die-casting solutions drive manufacturing change in high-pressure aluminum die casting from start to finish, including die lubricants, fire-resistant hydraulic fluids, metalworking or porosity sealing.

Fire-resistant hydraulic fluids support safe and uninterrupted production while reducing environmental impact for the world's most successful manufacturing companies.

Corrosion preventives and coatings increase corrosion protection and optimize processes and efficiency for the world's most successful manufacturing companies.

*For more information, visit https://investors.quakerhoughton.com/presentations
See the 2022 investor presentation

SELECTED FINANCIAL DATA

(In thousands except per share data, percentages, dividends and number of employees)	2021 (1)	2020 (2)	2019 (3)	2018 (4)
Summary of Operations				
Net sales	1,761,158	$1,417,677	$1,133,503	$867,520
Income before taxes and equity in net income of associated companies	146,991	27,139	28,904	83,098
Net income attributable to Quaker Chemical Corporation	121,369	39,658	31,622	59,473
Per share				
Net income attributable to Quaker Chemical Corporation Common Shareholders—basic	6.79	2.23	2.08	4.46
Net income attributable to Quaker Chemical Corporation Common Shareholders—diluted	6.77	2.22	2.08	4.45
Dividends declared	1.62	1.56	1.525	1.465
Dividends paid	1.60	1.55	1.51	1.45
Financial Position				
Current assets	920,254	792,727	715,972	418,510
Current liabilities	430,467	382,960	359,934	151,470
Working capital	489,787	409,767	356,038	267,040
Property, plant and equipment, net	197,520	203,883	213,469	83,923
Total assets	2,955,760	2,891,834	2,850,316	709,665
Long-term debt	836,412	849,068	882,437	35,934
Total equity	1,387,922	1,320,914	1,242,366	436,369
Other Data				
Current ratio	2.14/1	2.07/1	1.99/1	2.76/1
Capital expenditures	21,457	17,901	15,545	12,886
Net income as a percentage of net sales	6.9%	2.8%	2.8%	6.9%
Return on average equity	9.0%	3.1%	3.8%	14.1%
Equity per share at end of year	77.55	74.00	70.05	32.72
Common stock per share price range:				
High	301.99	272.31	224.30	217.15
Low	215.86	108.14	141.79	137.95
Number of shares outstanding at end of year	17,897	17,851	17,735	13,338
Number of employees at end of year:				
Consolidated subsidiaries	4,700	4,200	4,500	2,160
Associated companies	600	600	600	70

(1) Net income attributable to Quaker Chemical Corporation in 2021 includes a $13.1 million gain associated with indirect tax credits related to certain Brazilian subsidiaries, $5.8 million of benefits related to the impact of certain discrete tax items, equity income from a captive insurance company of $5.0 million after tax, and $0.8 million for the non-service components of the Company's pension and postretirement benefit income, offset by $18.6 million of total combination, integration and other acquisition-related expenses, which includes a $5.4 million gain on the sale of certain held-for-sale real property assets and income of $0.6 million related to an indemnification asset as well as accelerated depreciation of $0.7 million recorded in costs of goods sold, $3.0 million of executive transition costs, $2.1 million of remediation costs associated with property damages at certain facilities, $1.4 million of restructuring expenses, $0.8 million of non-operating litigation costs at an inactive subsidiary, $0.8 million for the fair value step up of acquired inventory sold and $0.6 million of after-tax currency conversion impacts related to hyper-inflationary accounting at the Company's wholly owned Argentine subsidiaries. See the Non-GAAP Measures section in Item 7 of the 2021 Form 10-K.

(2) Net income attributable to Quaker Chemical Corporation in 2020 includes an $18.1 million gain related to restrictions lapsing on certain cash that was previously designated solely for the settlement of asbestos claims at an inactive subsidiary, $11.2 million of benefits related to the impact of certain discrete tax items, and equity income from a captive insurance company of $1.2 million after tax, offset by a $38.0 million non-cash, indefinite-lived intangible asset impairment, $30.3 million of total Houghton combination, integration and other acquisition-related expenses, which includes $0.7 million of accelerated depreciation recorded in costs of goods sold, as well as income of $0.8 million related to an indemnification asset and a loss of $0.6 million on the sale of held-for-sale assets related to the Combination, $21.6 million for the non-service components of the Company's pension and postretirement benefit costs which includes a $22.7 million settlement charge for the Company's termination of the Legacy Quaker U.S. Pension Plan, $5.5 million of restructuring expenses, $0.5 million of certain customer bankruptcy charges, $0.5 million of after-tax currency conversion impacts related to hyper-inflationary accounting at the Company's wholly owned Argentine subsidiaries and $0.2 million for the fair value step up of acquired inventory sold. See the Non-GAAP Measures section in Item 7 of the 2020 Form 10-K.

(3) The Company acquired Houghton on August 1, 2019 and Norman Hay on October 1, 2019, so results presented above reflect five months and three months, respectively, in the summary of operations and both are included in the December 31, 2019 financial position. Net income attributable to Quaker Chemical Corporation in 2019 includes equity income from a captive insurance company of $1.8 million after tax, a $5.3 million deferred tax benefit on an intercompany intangible asset transfer, $0.4 million tax credit related to the U.S. Tax Reform and a $0.1 million insurance insolvency recovery, offset by $38.0 million of total Houghton combination and other acquisition-related expenses, which includes approximately $2.1 million of interest costs to maintain the bank commitment related to the Combination and approximately $0.5 million of accelerated depreciation recorded in cost of goods sold, $26.7 million of restructuring expenses, $11.7 million for the fair value step up of Houghton and Norman Hay inventory sold, $2.8 million for the non-service components of the Company's pension and postretirement benefit costs, $1.1 million of certain customer bankruptcy charges, $1.0 million of after-tax currency conversion impacts related to hyper-inflationary accounting at the Company's wholly owned Argentine subsidiaries and $0.4 million of charges related to the settlement of a non-core equipment sale. See the Non-GAAP Measures section in Item 7 of the 2020 Form 10-K.

(4) Net income attributable to Quaker Chemical Corporation in 2018 includes equity income from a captive insurance company of $1.0 million after tax, a $0.4 million foreign currency transaction gain related to the liquidation of an inactive legal entity and a $0.1 million insurance insolvency recovery, offset by $19.5 million of total Houghton combination and other acquisition-related expenses, which includes approximately $3.5 million of interest costs to maintain the bank commitment related to the Combination and a $0.6 million gain on the sale of a held-for-sale asset, $2.3 million for the non-service components of the Company's pension and postretirement benefit costs, $5.8 million of tax charges related to the U.S. Tax Reform, $0.4 million of currency conversion impacts related to hyper-inflationary accounting at the Company's affiliate in Argentina, and $0.3 million of after-tax currency conversion impacts related to hyper-inflationary accounting at the Company's 50% owned affiliate in Venezuela. See the Non-GAAP Measures section in Item 7 of the 2020 Form 10-K.

WE ARE QUAKER HOUGHTON

A global leader in industrial process fluids, we continually improve and innovate so our customers can stay ahead in a changing world.

If it's made of metal, if it's rolled, cut, drawn or cast, Quaker Houghton is there, optimizing processes, reducing costs, advancing safety and sustainability—and driving progress.

We take on our customers' challenges as our own, bringing the right combination of science, engineering, and business savvy so they can meet the future fully confident that their operations will run even more efficiently, even more effectively—whatever comes next.

Forward Together™

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, 2021

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, or the average bid and asked price of such common equity, 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, 2021): $4,210,881,271

Indicate the number of shares outstanding of each of the registrant's classes of common stock, as of the latest practicable date: 17,899,345 shares of Common Stock, $1.00 Par Value, as of January 31, 2022.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Registrant's definitive Proxy Statement relating to the 2022 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 years ended December 31, 2020 and 2021; 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.

Item1. *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 the 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™") 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:

	2021	2020	2019
Metal removal fluids	23.4%	23.9%	19.9%
Rolling lubricants	22.2%	21.8%	21.9%
Hydraulic fluids	13.6%	13.3%	13.0%

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.

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 for its customers, revenue is recognized on a net reporting basis at the amount of the administrative fee earned by the Company for ordering the goods. See Note 5 of Notes to Consolidated Financial Statements in Item 8 of this Report.

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 competitive 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 2021, 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. As experienced during 2021, the Company's earnings have been and could continue to 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 2024. 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, 2021, 2020 and 2019 were $44.9 million, $40.0 million and $32.1 million, respectively.

Recent Acquisition Activity

The Company has completed several recent acquisitions that expand its strategic product offerings and increase the Company's presence in its core industries. The Company's 2021 and 2022 acquisitions consist of:

- In January 2022, the Company acquired a business related to the sealing and impregnation of metal castings for the automotive sector, as well as impregnation resin and impregnation systems for metal parts for approximately $1.4 million. This business expands the Company's geographic presence in Germany as well as broadens its product offerings and service capabilities within its existing impregnation business that was initially entered into as part of its past acquisition of Norman Hay.
- In January 2022, the Company acquired a business that provides pickling inhibitor technologies for the steel industry, drawing lubricants and stamping oil for metalworking, and various other lubrication, rust preventative, and cleaner applications, for approximately $8.0 million. This business broadens the Company's product offerings within its existing metals and metalworking business in the Americas region.
- In November 2021, the Company acquired a business that provides hydraulic fluids, coolants, cleaners, and rust preventative oils for approximately $3.7 million. This business expands the Company's geographic presence in Turkey as well as broadens its product offerings within its existing metalworking business.
- In November 2021, the Company acquired Baron Industries ("Baron"), a U.S. based privately held company that provides vacuum impregnation services of castings, powder metal and electrical components for an initial payment of approximately $7.1 million. Baron expands the Company's geographic presence as well as broadens its product offerings and service capabilities within its existing impregnation business.
- In September 2021, the Company acquired the remaining interest in Grindaix-GmbH ("Grindaix"), a Germany-based, high-tech provider of coolant control and delivery systems for approximately $2.9 million. Previously, in February 2021, the Company acquired a 38% ownership interest in Grindaix for approximately $1.7 million. Grindaix expands the Company's geographic presence in Germany and broadens its product offerings and service capabilities within its equipment solutions and fluid intelligence business.
- In June 2021, the Company acquired certain assets for the Company's chemical milling maskants product line for approximately $2.8 million.
- In February 2021, the Company acquired a tin-plating solutions business for the steel end market for approximately $25.0 million. This business broadens the Company's product offerings within its existing metals business globally.

Impact of COVID-19

The global outbreak of COVID-19, and its variants, has negatively impacted all locations where the Company does business. Although the Company has now operated in this COVID-19 environment for almost two years, the full extent of the outbreak and related business impacts continue to remain uncertain and volatile. This outbreak has significantly disrupted the operations of the Company and those of its suppliers and customers. 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.

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 $4.2 million, $3.7 million and $4.4 million during the years ended December 31, 2021, 2020 and 2019, 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 chief operating decision maker assesses the Company's performance. The Company has four reportable segments: (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.

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. Reference is made to (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, 2021, Quaker Houghton had approximately 4,700 full-time employees globally of whom approximately 1,200 were employed by the parent company and its U.S. subsidiaries, and approximately 3,500 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, 2021.

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.

Sustainability Report

We report our progress on Environmental, Social, and Governance ("ESG") milestones in our sustainability report, which is published annually and is available free of charge on our corporate website at home.quakerhoughton.com/sustainability. The Company's 2020 Sustainability Report reflects the most recent available data on a variety of topics, including specific information relating to the Company's: (i) environmental footprint and climate change commitments; (ii) diversity initiatives; (iii) safety initiatives and performance; and (iv) training courses our employees have completed. Information in these sustainability reports and on our website are not incorporated by reference in this Report and, accordingly, should not be considered part of this Report.

Environmental Strategy

In 2020, we established the Board Sustainability Committee, which has specific responsibility to assist the Board of Directors (the "Board") in its assessment, evaluation, and oversight of the Company's sustainability programs and initiatives pertaining to the Company's business, operations, and employees. In formulating our environmental strategy, our Executive Leadership Team ("ELT") and Board consider certain risks and uncertainties that may materially impact our financial condition and results of operations. These risks and uncertainties are further described in Item 1A of this Report.

In 2021, we set a target to achieve carbon neutrality in our global operations by 2030 and net zero emissions across our entire value chain by 2050. The Company established 15 long-term goals, based on the results of the Company's 2020 materiality assessment, which was completed with input from customers, investors, suppliers, and internal stakeholders. Our 15 long-term goals are closely aligned with the United Nations Sustainable Development Goals. We also identified short- and medium-term milestones that may help support the achievement of our 2030 targets.

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 ELT 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. Among other metrics, we measure training hours, turnover, time to hire, and diversity hiring to assess our progress in these areas.

Additionally, we regularly evaluate our compensation and benefits packages for our employees, 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.

Diversity, Equity, and Inclusion

As a global company, we want to build an organization that is inclusive of all people and representative of the communities in which we operate. Quaker Houghton provides equal employment opportunities and does not discriminate based on age, ethnicity, gender identity, disability / medical, race, religion, or sexual orientation. We believe that diversity and inclusion are embodied by having working norms and cultural familiarities whereby employees feel included, engaged, and rewarded, regardless of their background or where they sit in the organization.

Inclusion and diversity begin with the Board and ELT. The Board is comprised of twelve individuals with diverse experience and credentials, selected for their business acumen and ability to challenge and add value to management. Our current Board composition includes two female and four racially diverse directors out of a total of twelve directors. For additional information on the Company's leadership, refer to Item 4(a) Information about our Executive Officers and Item 10. Directors, Executive Officers and Corporate Governance.

We published our workforce demographics in our Sustainability Report. By publicly disclosing our workforce demographics, we increase transparency in the composition of our workforce as well as facilitate accountability in achieving progress in our diversity goals, including ensuring that diverse candidates are actively considered for roles throughout the organization.

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 ELT 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.

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 and global supply chain constraints on the Company's business, results of operations, and financial condition, our expectation that we will maintain sufficient liquidity and remediate any of our material weaknesses in internal control over financial reporting, and statements regarding the impact of increased raw material costs and pricing initiatives 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;
- cost increases in prices of raw materials and the impacts of constraints and disruptions in the global supply chain;
- our current and future results and plans including our sustainability goals; 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 2021 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 slowdowns and shutdowns, including as is currently being experienced by many automotive industry companies as a result of supply chain disruption. 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, as well as the potential for significant increases in raw material costs, supply chain disruptions, customer financial instability, worldwide economic and political disruptions such as the current conflict between Russia and Ukraine, foreign currency fluctuations, significant changes in applicable tax rates and regulations, future terrorist attacks and other acts of violence. 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 impact of COVID-19 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 including new variants, the continued uncertainty regarding global availability, administration, acceptance and long-term efficacy of vaccines, or other treatments for COVID-19 or its variants, the longer-term effects on the economy of the pandemic, including the resulting market volatility, and by 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 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 possible 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, which appears 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 the 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. 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 and gain scale or 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 2021, 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 identify and consummate the strategic acquisitions we identify and to successfully integrate these acquisitions into 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.

We have completed several 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 such as 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 our 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 our 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. 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 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 are also 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 the London Interbank Offered Rate ("LIBOR"). The LIBOR benchmark has been subject of national, international, and other regulatory guidance and proposals for reform and will cease to be provided with certain rates as of December 31, 2021 through June 30, 2023. In December 2021, the Company entered into the Second Amendment to Credit Agreement ("Second Amendment") with Bank of America N.A., to provide an update for the use of a non-U.S. dollar ("non-USD") currency LIBOR successor rate. 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, it remains uncertain what rate will succeed LIBOR. 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 may affect the level of interest payments on our portion of indebtedness that bear interest at variable rates.

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 our non-U.S. operations. Our success as a global business depends, 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 restrictions on transportation of materials;
- 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, or as a result of political and/or military conflict; 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 and 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, and the precise impact of the Brexit decision will only become clearer as Brexit progresses. 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 transactions; 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 can continue to result in a loss of sales, gross profit, and/or market share and can 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 recovering a substantial amount of raw material cost increases while retaining our customers as experienced in 2021, 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 as described within Item 7 of this Report.

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 other 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, transportation disruptions or rate increases, increased border controls or closures, extreme weather events, tariffs, rising fuel costs and capacity constraints. Significant delays or increased costs affecting our supply chain, such as we experienced in 2021 could materially affect our financial condition and results of operations. Disruptions at our suppliers have recently and could in the future 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. 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. These 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, including employee training programs, 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 these 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. 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 and we are often required to consult with and seek the consent or advice of such representatives. 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 that 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 for certain types of matters, including 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 or amount of any indemnity or other obligations we may have to pay 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 threats, attempted intrusions and other incidents, such as these, are becoming more sophisticated and frequent. Security breaches and cyber incidents have, from time to time, occurred and may occur in the future. Although the breaches and cyber incidents experienced to date have not had a material impact, 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, failure to successfully transition key roles, or the inability to hire, train, retain and manage qualified personnel could also adversely affect our business.

Increasing scrutiny and changing expectations from stakeholders with respect to our 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, 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 such as the current conflict between Russia and Ukraine, 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.

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 Company experienced material disruptions as a result of COVID-19 globally which negatively impacted all locations where the Company does business.

Although the Company has now operated in this COVID-19 environment for almost two years, the full extent of the outbreak and related business impacts continue to remain uncertain and volatile. This outbreak has significantly disrupted the operations of the Company and those of its suppliers and customers. During the pandemic, the Company initially experienced volume declines and lower net sales as compared to pre-COVID-19 levels. In addition, the COVID-19 pandemic and responses to the pandemic have at times significantly disrupted the global supply chain and have had a significant impact on raw material prices. These impacts may continue to occur and may become more significant and could continue to result in disruptions in our supply chain and our difficulty in procuring or inability to procure raw materials necessary for the manufacturing of our products. The impact of the COVID-19 pandemic and responses to it has increased and could continue to increase the costs of making and distributing our products or result in delays in delivering, or an inability to deliver, them to our customers.

Given 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 resurgences of the outbreak including as new variants continue to emerge, and continued restrictions on day-to-day life and business operations as well as increased border controls or closures and transportation disruptions, may result in volume declines and lower net sales in future periods.

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 continued 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, 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.

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 its variants and efforts to contain the virus (including, but not limited to, vaccines and treatments, 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 with certainty 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 in future 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, continued administration and long-term efficacy of vaccines 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 pandemic. 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.

The ultimate impact on our business of a widespread outbreak of a contagious disease will depend on, among other things, the extent and duration of the outbreak, the severity of the disease and the number of people infected, the development and continued uncertainty regarding availability, administration and long-term efficacy of a vaccine or other treatments, 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 outbreak or assist impacted businesses, such as fiscal stimulus and other legislation designed to deliver monetary aid and other relief.

We have previously identified material weaknesses in our internal control over financial reporting that could have resulted 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 for 2019 and 2020, we, in conjunction with our independent registered public accounting firm, identified certain material weaknesses. 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.

During 2020 and 2021, 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 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. As of December 31, 2021, the Company has remediated all of the previously identified material weaknesses and concluded that the Company's internal control over financial reporting is effective.

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 Carrollton, Georgia; Zion, Illinois; Detroit, Michigan; Dayton, Ohio; Middletown, Ohio; Strongsville, Ohio; 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; 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; 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; Waukegan, Illinois; Zion, Illinois; Madison Heights, Michigan; Lewisburg, Tennessee; and Coventry, U.K. With the exception of the Conshohocken, Santa Fe Springs, Madison Heights, Lewisburg, Aurora, Karlshamn, Rayong, Coventry, and Sydney sites, which are leased, the remaining principal facilities are owned by the Company and, as of December 31, 2021, 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. Most 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 155 at each location with capacities ranging from 1,000 to 82,000 gallons, and processing or manufacturing vessels ranging in capacity from 2 to 29,000 gallons.

Each of Quaker Houghton'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 (with the exception of Andrew E. Tometich) 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 David A. Will, is appointed annually to a one year term. Mr. Will is considered an executive officer in his capacity as principal accounting officer for purposes of this Item 4(a).

Name, Age, and Present Position with the Company	Business Experience During the Past Five Years and Period Served as an Officer
Andrew E. Tometich, 55 Chief Executive Officer and President	Mr. Tometich, who has been employed by the Company since October 13, 2021, has served as Chief Executive Officer and President since December 1, 2021. Prior to joining the Company, Mr. Tometich served as Executive Vice President, Hygiene, Health and Consumable Adhesives at H.B. Fuller from August 2019 until September 17, 2021. Before that, Mr. Tometich was Senior Vice President, Specialty Materials Business at Corning Incorporated from September 2017 until August 2019 and President, Performance Silicones Business Unit at The Dow Chemical Company from June 2016 until February 2017 after having positions of increasing responsibility at Dow Corning Corporation and its subsidiaries from 1989 through 2016.
Joseph A. Berquist, 50 Executive Vice President, Chief Strategy Officer, and Managing Director, Global Specialty Businesses	Mr. Berquist, who has been employed by the Company since 1997, has served as Executive Vice President, Chief Strategy Officer, and Managing Director, Global Specialty Businesses since September 9, 2021. Prior to that role, he served as Senior Vice President, Global Specialty Businesses and Chief Strategy Officer from August 2019 to September 8, 2021. Mr. Berquist served as Vice President and Managing Director – North America from April 2010 until July 2019.
Jeewat Bijlani, 45 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.
Shane W. Hostetter, 40 Senior Vice President, Chief Financial Officer	Mr. Hostetter, who has been employed by the Company since July 2011, has served as Senior Vice President, Chief Financial Officer since April 19, 2021. Prior to that role, he served as Vice President, Finance and Chief Accounting Officer from August 2019 until April 18, 2021. He served as Global Controller and Principal Accounting Officer from September 2014 until July 2019.

Name, Age, and Present Position with the Company	Business Experience During the Past Five Years and Period Served as an Officer
Dieter Laininger, 58 . . . . Senior Vice President, Managing Director—Asia / Pacific	Mr. Laininger, who has been employed by the Company since 1991, has served as Senior Vice President, 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, 60 . . . . 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 previously served as Vice President, Global Operations, EHS and Procurement from April 2018 until July 2019. Prior to that role, Mr. Platzer served as Vice President and Managing Director – EMEA from January 2006 through March 2018.
Dr. David Slinkman, 57 . . . . 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.
Adrian Steeples, 61 . . . . 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 previously served as Vice President and Managing Director – EMEA from April 2018 until July 2019. Prior to that role, he served as Vice President and Managing Director—Asia/Pacific from July 2013 through March 2018.
Robert T. Traub, 57 . . . . 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 previously served as Vice President, General Counsel and Corporate Secretary from April 2015 until July 2019.
David A. Will, 37 . . . . Vice President, Global Controller and Principal Accounting Officer	Mr. Will, who has been employed by the Company since 2014, has served as Vice President, Global Controller, and Principal Accounting Officer since April 19, 2021. Prior to that role, Mr. Will served as the Corporate Controller from August 2019 until April 18, 2021. Before that, he served as the Global Assistant Controller from December 2014 to August 2019.

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 $1.62 per share of outstanding common stock or $29.0 million during the year ended December 31, 2021 and $1.56 per share of outstanding common stock or $27.8 million during the year ended December 31, 2020. In February and May 2021, our Board declared quarterly cash dividends of $0.395 per share of outstanding common stock, payable to shareholders of record in April 2021 and July 2021, respectively. Subsequently, our Board declared quarterly dividends of $0.415 per share of outstanding common stock in August and November 2021, respectively, payable to shareholders of record in October 2021 and January 2022, 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 17, 2022, 17,899,286 shares of Quaker common stock were issued and outstanding and were held by 649 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 2021 for the period covered by this report:

Issuer Purchases of Equity Securities

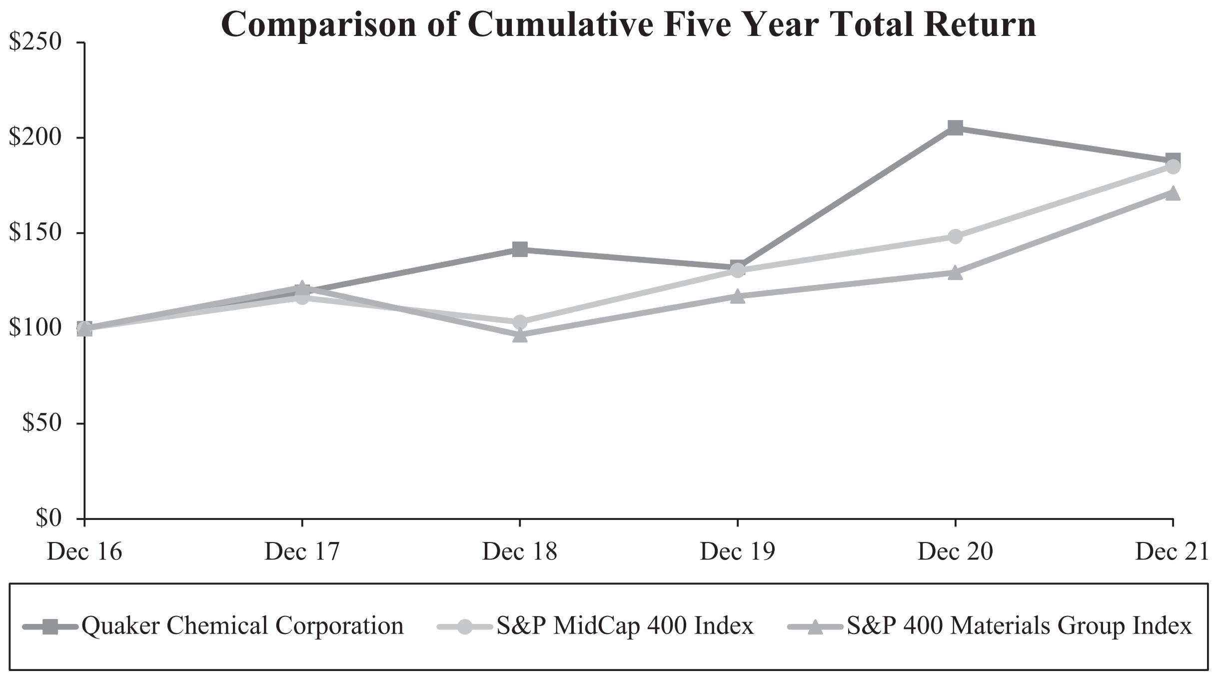
Period	(a) Total Number of Shares Purchased (1)	(b) Average Price Paid Per Share (2)	(c) Total Number of Shares Purchased as part of Publicly Announced Plans or Programs	(d) Approximate Dollar Value of Shares that May Yet be Purchased Under the Plans or Programs (3)
October 1 — October 31, 2021	—	$—	—	$86,865,026
November 1 — November 30, 2021	—	$—	—	$86,865,026
December 1 — December 31, 2021	—	$—	—	$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 2021. 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 2021. 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, restricted stock award, or restricted stock unit 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"), and it 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, 2021.

Stock Performance Graph: The following graph compares the cumulative total return (assuming reinvestment of dividends) from December 31, 2016 to December 31, 2021 for (i) Quaker's common stock, (ii) the S&P MidCap 400 Index (the "MidCap Index"), and (iii) the S&P 400 Materials Group Index (the "Materials Group Index"). The graph assumes the investment of $100 on December 31, 2016 in each of Quaker's common stock, the stocks comprising the MidCap Index and the Materials Group Index, respectively.



	12/31/2016	12/31/2017	12/31/2018	12/31/2019	12/31/2020	12/31/2021
Quaker	$100.00	$119.03	$141.53	$132.11	$205.30	$188.21
MidCap Index	100.00	116.24	103.36	130.44	148.26	184.97
Materials Group Index	100.00	121.55	96.79	116.99	129.45	171.17

Item 6. ***Selected Financial Data.***

Reserved.

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 years ended December 31, 2020 and 2021; 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.

Executive Summary

Quaker Houghton is the 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 2021 performance was highlighted by the continued recovery from the impacts of COVID-19 in 2020 as well as the ongoing execution of integration activities and synergy realization, which led to record net sales and adjusted EBITDA in 2021 despite the continued escalation in raw material cost headwinds and global supply chain pressures. Specifically, net sales of $1,761.2 million in 2021 increased 24% compared to $1,417.7 million in 2020, primarily due to higher volumes of approximately 13%, including additional net sales from acquisitions of 4%, increases from selling price and product mix of approximately 8% and the positive impact from foreign currency translation of 3%. The increase in sales volumes compared to 2020 was primarily a result of continued new business wins and the year-over-year improvement in end market conditions since the beginning of the COVID-19 pandemic in early 2020, partially offset by lower automotive sales due to semiconductor shortages and delayed shipments due to supply chain challenges that occurred towards the end of 2021. The increase in selling price and product mix is primarily the result of the Company's broad price increases implemented during 2021 to help offset the unprecedented increases in raw material costs as well as global supply chain and logistics cost pressures the Company has experienced throughout 2021.

The Company's net income and earnings per diluted share of $121.4 million and $6.77 in 2021, respectively, increased compared to $39.7 million and $2.22 per diluted share, respectively, in 2020. Excluding non-recurring items, including costs associated with the Combination and other non-core items in each period, the Company's current year non-GAAP net income and non-GAAP earnings per diluted share were $122.8 million and $6.85, respectively, compared to $85.2 million and $4.78, respectively, in 2020. The increase in the Company's current year earnings drove a 23% higher adjusted EBITDA to a full year record of $274.1 million compared to $222.0 million in 2020, primarily due to the significant increase in net sales year-over-year as well as higher realized cost synergies from the Combination, partially offset by lower gross margins driven by higher raw material and input costs and the impacts of disruptions in the global supply chain experienced in 2021 as well as higher selling, general and administrative expenses ("SG&A") including the impact of higher sales on direct selling expenses and additional SG&A from recent acquisitions.

The Company's 2021 operating performance in each of its four reportable segments: (i) Americas; (ii) EMEA; (iii) Asia/Pacific; and (iv) Global Specialty Businesses, reflect similar drivers to that of its consolidated performance. All four segments had higher net sales compared to 2020 reflecting the continued rebound in 2021 from the negative impacts of COVID-19 on the Company's end markets as well as continued success of winning new business in each of the Company's segments during 2021. Each of the Company's geographic segments benefited from higher organic sales volumes in 2021 while all of the Company's segments also benefitted from additional net sales from acquisitions, the positive impact from foreign currency translation due to the strengthening of most major currencies against the U.S. dollar, and from increases in selling price and product mix. As reported, each of the Company's reportable segment operating earnings were higher compared to 2020 reflecting the increase in net sales including the benefits of acquisitions and other factors mentioned; however, all of the Company's segment's operating earnings were negatively impacted by persistent raw material inflation, higher logistics, labor and manufacturing costs, impacts of disruptions to the global supply chain as well as higher SG&A which were a result of an increase in direct selling expenses associated with year-over-year inflation increases and increases due to the increase in net sales as well as the lower levels of prior year SG&A as a result of temporary cost saving measures implemented in response to COVID-19. 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 7, below.

The Company generated net operating cash flow of $48.9 million in 2021 compared to $178.4 million in 2020. The decrease in net operating cash flow year-over-year was primarily driven by a significant change in working capital compared to the prior year, mainly increases in accounts receivable, due to higher net sales and in inventory, due to higher costs as well as building inventories in response to global supply chain and logistics pressures. 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 7, below.

Overall, the Company's 2021 results were good and reflected the Company's ability to navigate through persistent raw material cost pressures, supply chain challenges and automotive semiconductor shortages. Increases in net sales in all segments were driven by the continued year-over-year improvement in the Company's end-markets and increased customer demand from lower levels experienced during 2020 as a result of COVID-19; however, each segment was negatively impacted by the significant escalation of raw material costs as well as higher levels of SG&A compared to the prior year which included certain temporary cost saving measures adopted during the onset of COVID-19. Continued strong customer demand in 2021 coupled with ongoing new business wins and the execution of integration activities and synergy realization helped to partially offset the negative impacts from the continued escalation of raw material costs and continued supply chain pressures.

As the Company looks toward 2022, the business is well positioned to continue to outpace market growth rates and deliver value-added solutions and services to its customers. Demand remains healthy across most of our end markets; however, the Company expects raw material cost pressures and supply chain disruptions to persist throughout 2022. To mitigate these headwinds, the Company continues to implement further price actions and is actively managing its cost structure. The Company believes these actions will begin to drive a recovery in margins as it progresses through 2022. The Company remains committed to advancing its customer intimate strategy and sustainability program and delivering earnings growth in 2022 and beyond.

On-going impact of COVID-19

The global outbreak of COVID-19 has negatively impacted all locations where the Company does business. Although the Company has now operated in this COVID-19 environment for almost two years, the full extent of the outbreak and related business impacts continue to remain 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. During the pandemic, the Company initially experienced volume declines and lower net sales as compared to pre-COVID-19 levels, as further described in this section. 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. The prolonged pandemic and resurgences of the outbreak including as new variants continue to emerge, and continued restrictions on day-to-day life and business operations as well as increased border controls or closures and transportation disruptions may result in volume declines and lower net sales in future periods. 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, 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.

The Company's top priority, especially during this pandemic, is to protect the health and safety of its employees and customers, while working to ensure business continuity to meet customers' needs. The Company continues to take steps to protect the health and wellbeing of its people in affected areas through various actions, including enabling work at home where needed and practicable, 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 has not and does not expect that it will incur material expenses implementing these health and safety policies. All of the Company's more than 30 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. The Company's fiscal year 2021 showed year-over-year improvement from the prior fiscal year and continued a trend of gradual volume improvement which began in the second half of 2020. The Company continues to expect that the impacts from COVID-19 will gradually decline subject to the effective containment of the virus and its variants and successful distribution and acceptance of the available vaccines and treatments. However, the incidence of reported cases of COVID-19 or a variant in several geographies where the Company has significant operations remains high and continues to evolve 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 to pre-COVID-19 levels. The Company took various actions to temporarily conserve cash and reduce costs since the onset of the pandemic and 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 to date 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 $12.3 million and $13.1 million as of December 31, 2021 and 2020, respectively. The Company recorded expense to increase its provision for doubtful accounts by $0.7 million, $3.6 million and $1.9 million for the years ended December 31, 2021, 2020 and 2019, 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 $0.1 million, $0.4 million and $0.2 million for the years ended December 31, 2021, 2020 and 2019, 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, 2021 was $95.3 million, which included four investments: $21.5 million for a 32% interest in Primex, Ltd. (Barbados); $7.1 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 $66.4 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 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, 2021 and 2020, 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.

Pursuant to the Tax Cuts and Jobs Act ("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, 2021, $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, 2021, the Company has a deferred tax liability of $8.4 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, 2021 was approximately $377.4 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. The Company's consolidated goodwill at both December 31, 2021 and 2020 was $631.2 million. The Company completed its annual impairment assessment over goodwill during the fourth quarter of 2021 by performing a qualitative assessment. Based on the assessment performed, the Company concluded that there was no evidence of events or circumstances that would indicate a material change from the Company's prior year quantitative assessment by reporting unit and, therefore, no impairment charges were warranted. The Company's consolidated indefinite-lived intangible assets at December 31, 2021 and 2020 were $196.9 million and $205.1 million, respectively, which primarily consists of Houghton and Fluidcare™ trademarks and tradename. The Company completed its annual indefinite-lived intangible asset impairment assessment during the fourth quarter of 2021, and determined that no impairment charge was warranted. The determination of estimated fair value of these indefinite-lived intangible assets is 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 royalty rates, as well as revenue growth rates and terminal growth rates. The Company's impairment assessment concluded that the carrying value of acquired Houghton and Fluidcare™ trademarks and tradename intangible assets exceeded fair value by approximately 61%. See Note 16 of Notes to Consolidated Financial Statements in Item 8 of this Report.

As previously disclosed, as of March 31, 2020, the Company concluded that the impact of COVID-19 did not represent a triggering event 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. In the first quarter of 2020, as a result of the impact of COVID-19 driving a decrease in projected legacy Houghton net sales during that year and the impact of the sales decline on projected future legacy Houghton net sales as well as an increase in the weighted average cost of capital 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 was recorded during the first quarter of 2020 to write down the carrying values of these intangible assets to their estimated fair values.

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 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, 2021:

	1/2 Percentage Point Increase			1/2 Percentage Point Decrease		
(dollars in millions)	**Foreign**	**U.S.**	**Total**	**Foreign**	**U.S.**	**Total**
Discount rate (1)	$(0.2)	$0.2	$0.0	$0.3	$(0.2)	$0.1
Expected rate of return on plan assets (2)	0.5	0.2	0.7	(0.5)	(0.2)	(0.7)

(1) The weighted-average discount rate used to determine net periodic benefit costs for the year ended December 31, 2021 was 1.4% for Foreign plans and 2.7% 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, 2021 was 2.1% for Foreign plans and 5.8% 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, 2021, the Company had cash, cash equivalents and restricted cash of $165.2 million. Total cash, cash equivalents and restricted cash was $181.9 million at December 31, 2020. The $16.7 million decrease in cash, cash equivalents and restricted cash was the net result $49.1 million of cash used in investing activities, $13.5 million of cash used in financing activities and approximately $3.1 million of negative impacts due to the effect of foreign currency translation on cash, partially offset by $48.9 million of cash provided by operating activities.

Net cash flows provided by operating activities were $48.9 million in 2021 compared to $178.4 million in 2020. The Company's current year net operating cash flow decrease was primarily driven by a significant change in working capital which more than offset the Company's higher earnings in 2021. The significant increase in current year net sales resulted in a large increase in accounts receivable in 2021 as compared to a significant decrease during 2020 as net sales and the associated accounts receivables significantly declined in 2020 due to the negative impact from COVID-19. In addition, the Company has experienced an increase in inventory in 2021 as a result of continued rising raw material costs as well as a build in inventory to ensure the Company has appropriate stock to meet customer demands in response to ongoing stress on the global supply chain.

Net cash flows used in investing activities were $49.1 million in 2021 compared to $71.4 million in 2020. This $22.3 million decrease in cash outflows used in investing activities was due to lower cash payments related to acquisitions during 2021 as a result of the level of acquisition activity in each year and higher cash proceeds from the disposition of assets, which includes the sale of certain held-for-sale real property assets related to the Combination. Capital expenditures also increased to $21.5 million in 2021 compared to $17.9 million in 2020 due to the continued strategic and integration related capital investments the Company has and continues to make.

Net cash flows used in financing activities were $13.5 million in 2021 compared to $75.3 million in 2020. The $61.8 million decrease in net cash outflows from financing activities was primarily driven by an increase in borrowings in the current year under the Company's revolving credit facility compared to repayments in the prior year which was driven by significant working capital investment in the current year described above. In addition, the Company paid $28.6 million of cash dividend during 2021, a $1.0 million or 4% increase in cash dividends compared to the prior year due to 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 2021.

The Company's primary 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. On December 10, 2021, the Company amended the Credit Facility to include an update to provide for the use of a non-USD currency LIBOR successor rate. The weighted average interest rate incurred on the outstanding borrowings under the Credit Facility during the year ended and as of December 31, 2021 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 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, 2021, the consolidated net debt to consolidated adjusted EBITDA ratio may not exceed 3.75 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 dividends if the Company is in default or if the amount of the dividends 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, 2021 and 2020, 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, 2021, 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, 2021, the Company had Credit Facility borrowings outstanding of $889.6 million. As of December 31, 2020, the Company had Credit Facility borrowings outstanding of $887.1 million. The Company has unused capacity under the Revolver of approximately $184 million, net of bank letters of credit of approximately $4 million, as of December 31, 2021. The Company's other debt obligations are primarily industrial development bonds, bank lines of credit and municipality-related loans, which totaled $11.8 million and $12.1 million as of December 31, 2021 and 2020, respectively. Total unused capacity under these arrangements as of December 31, 2021 was approximately $26 million. The Company's total net debt as of December 31, 2021 was $736.2 million.

The Company estimates that it realized full year cost synergies related to the Combination in 2021 of approximately $75 million compared to $58 million in 2020. The Company has fully achieved its annual target Combination cost synergies of approximately $80 million going forward. The Company incurred $18.6 million of total Combination, integration and other acquisition-related expenses in 2021, which includes $0.7 million of accelerated depreciation and is net of a $5.4 million gain on the sale of certain held-for-sale real property assets and $0.6 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 $20.6 million related to the Combination, integration and other acquisition-related expenses during 2021. Comparatively, in 2020, the Company incurred $30.3 million of total Combination, integration and other acquisition-related expenses, including $0.8 million of accelerated depreciation, a $0.6 million loss on the sale of held-for-sale assets, an $0.8 million of other income related to an indemnification asset, and aggregate net cash outflows related to these costs were approximately $29.4 million. While the Company has incurred significant integration costs in 2019, 2020 and 2021, the Company expects to incur additional integration and operating costs as well as higher capital expenditures to further optimize its footprint, processes and other functions over the next several years.

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 $1.4 million and $5.5 million of restructuring and related charges in 2021 and 2020, respectively, as a result of the QH Program. The QH Program includes restructuring and associated severance costs to reduce total headcount by approximately 400 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 first quarter of 2021 and fourth quarter of 2020, certain of these facilities were sold and the Company recognized a gain on disposal of $5.4 million and a loss on disposal of $0.6 million, respectively, included within other income (expense), net on the Consolidated Statement of Income. The exact timing and total costs associated with the QH Program will depend on a number of factors and is subject to change; however, reductions in headcount and site closures have continued, and the Company currently expects additional headcount reductions and site closures to occur into 2022 and estimates that the anticipated cost synergies realized under the QH 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 2021 of approximately $5.3 million compared to $15.7 million in 2020.

During 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.

As of December 31, 2021, the Company's gross liability for uncertain tax positions, including interest and penalties, was $28.7 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 $7.3 million as a result of offsetting benefits in other tax jurisdictions. During the year ended 2021, the Company recorded $13.1 million of non-income tax credits for certain of its Brazilian subsidiaries. The Company expects to utilize these credits to offset certain Brazilian federal tax payments over approximately two years, which began in the fourth quarter of 2021. See Note 26 of Notes to Consolidated Financial Statements in Item 8 of this Report.

During the third quarter of 2021, two of the Company's locations suffered property damage as a result of flooding and fire. The Company maintains property insurance for all of its facilities globally. The Company, its insurance adjuster and insurance carrier are actively managing the remediation and restoration activities associated with both of these events and at this time the Company has concluded, based on all available information and discussions with its insurance adjuster and insurance carrier, that the losses incurred during 2021 will be covered under the Company's property insurance coverage, net of an aggregate deductible of $2.0 million. The Company has received payments from its insurers of $2.1 million and has recorded an insurance receivable associated with these events of $0.7 million as of December 31, 2021. The Company and its insurance carrier continue to review the impact on operations as it relates to a potential business interruption insurance claim; however, as of the date of this report, the Company cannot reasonably estimate any probable amount of business interruption insurance claim recoverable, therefore the Company has not recorded a gain contingency for a possible business interruption insurance claim as of December 31, 2021. 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 and beyond, including but not limited to, payments of dividends to shareholders, costs related to the Combination and other acquisitions and as well as ongoing integration and optimization, pension plan contributions, capital expenditures, other business opportunities (including potential acquisitions), implementing actions to achieve the Company's sustainability goals 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, 2021, 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, 2021.

(dollars in thousands)	Payments due by period						
Contractual Obligations	**Total**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027 and Beyond**
Long-term debt	$900,633	$56,759	$75,553	$758,045	$122	$80	$10,074
Interest obligations	39,975	14,287	13,184	10,751	526	526	701
Capital lease obligations	868	219	212	196	176	65	—
Operating leases	41,395	11,346	9,041	7,017	5,292	4,197	4,502
Purchase obligations	3,652	3,197	416	39	—	—	—
Transition tax	8,500	—	1,529	3,099	3,872	—	—
Pension and other postretirement plan contributions	13,347	13,347	—	—	—	—	—
Other long-term liabilities (See Note 22 of Notes to Consolidated Financial Statements)	12,040	—	—	—	—	—	12,040
Total contractual cash obligations	$1,020,410	$99,155	$99,935	$779,147	$9,988	$4,868	$27,317

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 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 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 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,**		
	2021	**2020**	**2019**
Operating income	$150,466	$59,360	$46,134
Houghton combination, integration and other acquisition-related expenses (a)	24,611	30,446	35,945
Restructuring and related charges (b)	1,433	5,541	26,678
Fair value step up of acquired inventory sold (c)	801	226	11,714
Executive transition costs (d)	2,986	—	—
Inactive subsidiary's non-operating litigation costs (e)	819	—	—
Customer bankruptcy costs (f)	—	463	1,073
Facility remediation costs, net (g)	1,509	—	—
Charges related to the settlement of a non-core equipment sale (h)	—	—	384
Indefinite-lived intangible asset impairment (i)	—	38,000	—
Non-GAAP operating income	$182,625	$134,036	$121,928
Non-GAAP operating margin (%) (r)	10.4%	9.5%	10.8%

EBITDA, Adjusted EBITDA, Adjusted EBITDA Margin and Non-GAAP Net Income Reconciliations	**For the years ended December 31,**		
	2021	**2020**	**2019**
Net income attributable to Quaker Chemical Corporation	$ 121,369	$ 39,658	$ 31,622
Depreciation and amortization (a)(p)	87,728	84,494	45,264
Interest expense, net (a)	22,326	26,603	16,976
Taxes on income before equity in net income of associated companies (q)	34,939	(5,296)	2,084
EBITDA	266,362	145,459	95,946
Equity income in a captive insurance company (j)	(4,993)	(1,151)	(1,822)
Houghton combination, integration and other acquisition-related expenses (a)	17,917	29,538	35,361
Restructuring and related charges (b)	1,433	5,541	26,678
Fair value step up of acquired inventory sold (c)	801	226	11,714
Executive transition costs (d)	2,986	—	—
Inactive subsidiary's non-operating litigation cost (e)	819	—	—
Customer bankruptcy costs (f)	—	463	1,073
Facility remediation costs, net (g)	2,066	—	—
Charges related to the settlement of a non-core equipment sale (h)	—	—	384
Indefinite-lived intangible asset impairment (i)	—	38,000	—
Pension and postretirement benefit (income) costs, non-service components (k)	(759)	21,592	2,805
Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery (l)	—	(18,144)	(60)
Brazilian non-income tax credits (m)	(13,087)	—	—
Currency conversion impacts of hyper-inflationary economies (n)	564	450	1,033
Adjusted EBITDA	$ 274,109	$ 221,974	$ 173,112
Adjusted EBITDA margin (%) (r)	15.6%	15.7%	15.3%
Adjusted EBITDA	$ 274,109	$ 221,974	$ 173,112
Less: Depreciation and amortization — adjusted (a)	87,002	83,732	44,680
Less: Interest expense, net — adjusted (a)	22,326	26,603	14,896
Less: Taxes on income before equity in net income of associated companies — adjusted (o)(q)	41,976	26,488	24,825
Non-GAAP net income	$ 122,805	$ 85,151	$ 88,711

Non-GAAP Earnings per Diluted Share Reconciliations

	For the years ending December 31,		
	2021	**2020**	**2019**
GAAP earnings per diluted share attributable to Quaker Chemical Corporation common shareholders	$ 6.77	$ 2.22	$ 2.08
Equity income in a captive insurance company per diluted share (j)	(0.28)	(0.07)	(0.12)
Houghton combination, integration and other acquisition-related expenses per diluted share (a)	0.79	1.31	2.05
Restructuring and related charges per diluted share (b)	0.07	0.23	1.34
Fair value step up of acquired inventory sold per diluted share (c)	0.03	0.01	0.58
Executive transition costs per diluted share (d)	0.13	—	—
Inactive subsidiary's non-operating litigation costs per diluted share (e)	0.04	—	—
Customer bankruptcy costs per diluted share (f)	—	0.02	0.05
Facility remediation costs, net per diluted share (g)	0.09	—	—
Charges related to the settlement of a non-core equipment sale per diluted share (h)	—	—	0.02
Indefinite-lived intangible asset impairment per diluted share (i)	—	1.65	—
Pension and postretirement benefit costs, non-service components per diluted share (k)	(0.04)	0.79	0.14
Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery per diluted share (l)	—	(0.78)	0.00
Brazilian non-income tax credits per diluted share (m)	(0.46)	—	—
Currency conversion impacts of hyper-inflationary economies per diluted share (n)	0.03	0.02	0.07
Impact of certain discrete tax items per diluted share (o)	(0.32)	(0.62)	(0.38)
Non-GAAP earnings per diluted share (s)	$ 6.85	$ 4.78	$ 5.83

(a) Houghton combination, integration and other acquisition-related expenses include certain legal, financial, and other advisory and consultant costs incurred in connection with post-closing integration activities including internal control readiness and remediation, as well as due diligence, regulatory approvals and closing the Combination. These costs are not indicative of the future operating performance of the Company. Approximately $0.6 million, $1.5 million and $9.4 million for the years ended December 31, 2021, 2020 and 2019, 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 2021, 2020 and 2019, the Company recorded $0.7 million, $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, the Company incurred $2.1 million 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 2021 and 2020, the Company recorded $0.6 million and $0.8 million, respectively, of other income related to an indemnification asset. During 2021 and 2020, the Company recorded a gain of $5.4 million and a loss of $0.6 million, respectively, on the sale of certain held-for-sale real property 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.

(b) 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.

(c) Fair value step up of inventory sold relates to expense associated with selling inventory of acquired businesses which was adjusted to fair value as part of purchase accounting. This increases to costs of goods sold ("COGS") are not indicative of the future operating performance of the Company.

(d) Executive transition costs represent the costs related to the Company's search, hiring and transition to a new CEO in connection with the executive transition that look place in 2021. These expenses are not indicative of the future operating performance of the Company.

(e) Inactive subsidiary's non-operating litigation costs represents the charges incurred by an inactive subsidiary of the Company and are a result of the termination of restrictions on insurance settlement reserves. These charges are not indicative of the future operating performance of the Company. See Note 26 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(f) 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.

(g) Facility remediation costs, net, presents the gross costs associated with remediation, cleaning and subsequent restoration costs associated with the property damage to certain of the Company's facilities, net of insurance recoveries received. These charges are non-recurring and are not indicative of the future operating performance of the Company. See Note 26 of Notes to Consolidated Financial Statements, which appears in Item 8 of this Report.

(h) 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.

(i) 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 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.

(j) 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.

(k) Pension and postretirement benefit (income) 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.

(l) 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.

(m) Brazilian non-income tax credits represent indirect tax credits related to certain of the Company's Brazilian subsidiaries prevailing in a legal claim as well as the Brazil Supreme Court ruling on these non-income tax matters. The non-income tax credit is non-recurring and not indicative of the future operating performance of the Company. See Note 26 of Note to Consolidated Financial Statements, which appears in Item 8 of this Report.

(n) 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's Argentine Houghton subsidiary also applies hyper-inflationary accounting. During 2021, 2020 and 2019, the Company incurred non-deductible, pre-tax charges related to the Company's Argentine affiliates. 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.

(o) The impacts of certain discrete tax items includes the impact of changes in certain valuation allowances recorded on certain of the Company's foreign tax credits, tax law changes in foreign jurisdictions, changes in withholding tax rates, the tax impacts of non-income tax credits associated with certain of the Company's Brazilian subsidiaries and the associated impact on previously accrued for distributions at certain of the Company's Asia/Pacific subsidiaries, the one-time deferred tax benefit recorded on the transfer of intangible assets between the Company's subsidiaries as well as the offsetting impact and amortization of a deferred tax benefit the Company recorded during 2020 and 2019 related to similar intercompany intangible asset transfers. Additionally, the 2019 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.

(p) Depreciation and amortization for the years ended December 31, 2021, 2020 and 2019 includes $1.2 million, $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 Korea Houghton Corporation as a result of required purchase accounting.

(q) 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. Houghton combination, integration and other acquisition-related expenses described in (a) resulted in incremental taxes of $4.2 million for 2021, $6.9 million for 2020, and $6.7 million for 2019. Restructuring and related charges described in (b) resulted in incremental taxes of $0.3 million for 2021, $1.4 million for 2020 and $6.2 million for 2019. Fair value step up of inventory sold described in (c) resulted in incremental taxes of $0.2 million, less than $0.1 million and $2.9 million for 2021, 2020 and 2019, respectively. Executive transition expenses described in (d) resulted in incremental taxes of $0.7 million for 2021. Inactive subsidiary non-operating litigation costs described in (e) resulted in incremental taxes of $0.2 million for 2021. Customer bankruptcy costs described in (f) resulted in incremental taxes of $0.1 million in 2020 and $0.3 million in 2019. Facility remediation costs, net described in (g) results in incremental taxes of $0.5 million for 2021. Charges related to the settlement of a non-core equipment sale described in (h) resulted in incremental taxes of $0.1 million for 2019. Indefinite-lived intangible asset impairment described in (i) resulted in incremental taxes of $8.7 million for 2020. Pension and postretirement benefit (income) costs, non-service components described in (k) resulted in a reduction of taxes of $0.1 million for 2021 and incremental taxes of $7.5 million for 2020, and $0.7 million for 2019. Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery described in (l) resulted in a reduction of taxes of $4.2 million in 2020 and less than $0.1 million in 2019. Brazilian non-income tax credits described in (m) resulted in a reduction of taxes of $4.8 million for 2021. The impact of certain discrete items described in (o) resulted in a tax benefit of $5.8 million for 2021, incremental taxes of $11.2 million for 2020, and a reduction of taxes of $5.7 million in 2019.

(r) 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.

(s) 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 commitments or obligations as of December 31, 2021. The Company's only off-balance sheet commitments or obligations outstanding as of December 31, 2021 represented approximately $6 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 2021 with 2020

Net sales were $1,761.2 million in 2021 compared to $1,417.7 million in 2020. The net sales increase of approximately $343.5 million or 24% year-over-year was primarily due to higher sales volumes of 13%, which includes additional net sales from recent acquisitions of 4%, increases from selling price and product mix of 8% and the positive impact of foreign currency translation of 3%. The increase in organic sales volumes compared to 2020 was primarily the result of the continued year-over-year improvement in end market conditions from the prior year impacts of COVID-19 and continued market share gains. Sales from acquisitions is primarily driven by the Company's acquisition of Coral Chemical Company ("Coral") in December 2020 and the tin-plating solutions business acquired in February 2021. The increase from selling price and product mix includes the impact of current year selling price increases implemented in response to the increases in raw material costs experienced in 2021. The positive impact from foreign currency translation is primarily the result of the strengthening of the Chinese renminbi, euro, Mexican peso, the Canadian dollar and the British pound against the U.S. dollar year-over-year.

COGS were $1,166.5 million in 2021 compared to $904.2 million in 2020. The increase in COGS of 29% was driven by the associated COGS on the increase in net sales described above, and continued increases in the Company's global raw material costs compared to the prior year and the impacts of supply constraints in the current year.

Gross profit in 2021 of $594.6 million increased $81.2 million or approximately 16% from 2020, due primarily to the increase in net sales noted above. The Company's reported gross margin in 2021 was 33.8% compared to 36.2% in 2020. The lower current year gross margin is primarily attributable to increased raw materials and other costs that began in the fourth quarter of 2020 and have continued throughout 2021 and the impacts of constraints on the world's global supply chain partially offset by the Company's ongoing pricing initiatives.

SG&A in 2021 increased $38.1 million compared to 2020 due primarily to the impact of sales increases on direct selling costs, year-over-year inflation increases, additional SG&A from recent acquisitions and higher

SG&A due to foreign currency translation, partially offset by lower incentive compensation year-over-year as well as the benefits of additional realized cost synergies associated with the Combination year-over-year. In addition, SG&A was lower in the prior year period as a result of temporary cost saving measures the Company implemented in response to COVID-19. While the Company continues to manage costs during the on-going pandemic, it has incurred higher SG&A year-over-year as the global economy continues to gradually rebound.

During 2021 and 2020, the Company incurred $23.9 million and $29.8 million, respectively, of Combination, integration and other acquisition-related expenses primarily for professional fees related to Houghton integration and other acquisition-related activities. See the Non-GAAP Measures section of this Item, above.

The Company initiated a restructuring program during 2019 as part of its global plan to realize cost synergies associated with the Combination. The Company incurred restructuring and related charges for reductions in headcount and site closures under this program, net of adjustments to initial estimates for severance, of an expense of $1.4 million and $5.5 million during 2021 and 2020, respectively. See the Non-GAAP Measures section of this Item, above.

Operating income in 2021 was $150.5 million compared to $59.4 million in 2020. Excluding Combination, integration and other acquisition-related expenses, restructuring and related charges and other non-core items, the Company's current year non-GAAP operating income of $182.6 million increased compared to $134.0 million in the prior year, primarily due to the increase in net sales described above and the benefits from cost savings related to the Combination offset by an increase in SG&A as well as the significant increases in raw material costs year-over-year. The Company estimates that it realized cost synergies associated with the Combination of approximately $75 million during 2021 compared to approximately $58 million during 2020.

The Company had other income, net, of $18.9 million in 2021 compared to other expense, net, of $5.6 million in 2020. The year-over-year change was primarily a result of other income related to certain non-income tax credits recorded by the Company's Brazilian subsidiaries, the gain on the sale of certain held-for-sale real property assets and lower foreign currency transaction losses in 2021 as compared to the prior year. The Company had non-service components of pension and postretirement benefit income in the current year compared to an expense in the prior year as a result of the $22.7 million pension settlement charge directly related to the termination of the Legacy Quaker U.S. pension plan partially offset by a $18.1 million gain related to the lapse of restrictions over certain cash that was previously designated solely for the settlement of asbestos claims at an inactive subsidiary, all of which are described in the Non-GAAP Measures section of this Item, above.

Interest expense, net, decreased $4.3 million compared to 2020 driven by lower current year average borrowings outstanding as a result of the additional revolver borrowings drawn during part of 2020 at the onset of the pandemic to add additional liquidity, coupled with a decline in overall interest rates year-over-year, as the weighted average interest rate incurred on borrowings under the Company's credit facility was approximately 1.6% during 2021 compared to approximately 2.2% during 2020.

The Company's effective tax rates for 2021 and 2020 were an expense of 23.8% and benefit of 19.5%, respectively. The Company's higher current year effective tax rate is driven by a higher level of pre-tax earnings and mix of earnings, as well as deferred tax expense related to the planned repatriation of non-U.S. earnings. In addition, the rate was impacted by certain one-time charges and benefits related to an intercompany intangible asset transfer and related royalty income recognition offset by changes in the valuation allowance for foreign tax credits. Comparatively, the prior year effective tax rate was impacted by the tax effect of certain one-time tax charges and benefits related to a 2020 intercompany intangible asset transfer, 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. Excluding the impact of these items as well as all other non-core items in each year, described in the Non-GAAP Measures section of this Item, above, the Company estimates that the 2021 and 2020 effective tax rates would have been approximately 26% and 25%, respectively. The higher estimated current year tax rate was primarily driven by a higher level of pre-tax earnings and the impact of changes in mix of earnings, deferred taxes related to the planned repatriation of non-U.S. earnings, and provision to return adjustments in the prior period. The Company may experience continued 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, the treatment of certain acquisition-related costs and the timing and amount of certain share-based compensation-related tax benefits, among other factors. In addition, the foreign tax credit valuation allowance, or absence thereof, is based on a number of variables, including forecasted earnings, which may vary.

Equity in net income of associated companies increased $2.0 million in 2021 compared to 2020, primarily due to higher current year income from the Company's interest in a captive insurance company partially offset by lower earnings from the Company's 50% interest in a joint venture in Korea compared to the prior year. See the Non-GAAP Measures section of this Item, above.

Net income attributable to noncontrolling interest was less than $0.1 million in 2021 compared to $0.1 million in 2020 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 positively impacted the Company's yearly results by approximately 6% driven by the positive impact from foreign currency translation on earnings as well as lower foreign exchange transaction losses in the current year as compared to the prior year.

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 prior 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 prior 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 2020, partially offset by lower prior year COGS on the decline in net sales due to COVID-19 and 2019 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 2020 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 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 2019, 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 negative impacts of COVID-19 on their estimated fair values. There were no additional impairment charges in the remainder of 2020 or in 2019. 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 non-GAAP operating income during 2020 of $134.0 million increased compared to $121.9 million in 2019, 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 2020.

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 2020.

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 2020 effective tax rate was impacted by the tax effect of certain one-time tax charges and benefits, including deferred tax benefits related to an intercompany intangible asset transfer, as well as changes in the valuation allowance for foreign tax credits, 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 2019 effective tax rate was primarily impacted by certain non-deductible costs associated with the Combination as well as a 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.

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 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.

Reportable Segments Review—Comparison of 2021 with 2020

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 of the Company assesses its performance. The Company has four reportable 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 the Company's reportable segments are comprised of net sales less COGS and SG&A directly related to the respective segment's product sales. 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, Restructuring and related charges, and COGS related to acquired inventory sold, which is adjusted to fair value as part of purchase accounting, are not included in segment operating earnings. Other items not specifically identified with the Company's reportable segments include interest expense, net, and other income (expense), net.

Americas

Americas represented approximately 33% of the Company's consolidated net sales in 2021. The segment's net sales were $572.6 million, an increase of $122.5 million or 27% compared to 2020. The increase in net sales was driven by a benefit in selling price and product mix of 11%, increases in organic volumes of approximately 10%, additional net sales from acquisitions of 5%, and the positive impact of foreign currency translation of 1%. The current year organic volume increase was driven by the continued improvement in end market conditions compared to the prior year which was impacted by COVID-19. The increase in selling price and product mix is primarily driven by price increases implemented to help offset the significant increases in raw material and other input costs incurred during 2021. The foreign exchange impact was primarily driven by the strengthening of the Mexican peso against the U.S. dollar, as this exchange rate averaged 20.27 in 2021 compared to 21.34 during 2020. This segment's operating earnings were $124.9 million, an increase of $28.5 million or 30% compared to 2020. The increase in segment operating earnings reflects the higher net sales, described above, partially offset by lower gross margins driven by the continued raw material cost increases and global supply chain and logistics pressures coupled with higher SG&A including an increase in direct selling costs associated with higher net sales, SG&A from acquisitions and an increase in SG&A as the prior year included temporary cost savings measures implemented in response to the onset of the COVID-19 pandemic.

EMEA

EMEA represented approximately 27% of the Company's consolidated net sales in 2021. The segment's net sales were $480.1 million, an increase of $96.9 million or 25% compared to 2020. The increase in net sales was driven by a benefit from selling price and product mix of 10%, increases in organic volumes of approximately 9%, the positive impact of foreign currency translation of 4%, and additional net sales from acquisitions of 2%. The increase in selling price and product mix is primarily driven by price increases implemented to offset the significant increase in raw material and other input costs incurred during 2021. The current year volume increase was driven by the continued improvement in end market conditions compared to the prior year which was heavily impacted by COVID-19. The foreign exchange impact was primarily driven by the strengthening of the euro against the U.S. dollar as this exchange rate averaged 1.18 in 2021 compared to 1.14 in 2020. This segment's operating earnings were $85.2 million, an increase of $16.0 million or 23% compared to 2020. The increase in segment operating earnings reflects the higher net sales described above, partially offset by lower current year gross margins driven by the continued raw material cost increases and global supply chain and logistics pressures as well as higher SG&A including increases in direct selling costs associated with higher net sales as well as increases as the prior year included temporary cost savings measures implemented in response to the onset of the COVID-19 pandemic.

Asia/Pacific

Asia/Pacific represented approximately 22% of the Company's consolidated net sales in 2021. The segment's net sales were $388.2 million, an increase of approximately $72.9 million or 23% compared to 2020. The increase in net sales year-over-year was driven by increases in volumes of approximately 15%, the positive impact of foreign currency translation of 5%, increases from selling price and product mix of 2% and additional net sales from acquisitions of 1%. The current year volume increase was driven by the continued improvement in end market conditions compared to the prior year which was impacted by COVID-19. The foreign exchange impact was primarily due to the strengthening of the Chinese renminbi against the U.S. dollar as this exchange rate averaged 6.45 in 2021 compared to 6.90 in 2020. This segment's operating earnings were $96.3 million, an increase of $8.0 million or 9% compared to 2020. The increase in segment operating earnings was driven by the higher net sales described above, partially offset by lower gross margins driven by the continued raw material cost increases and global supply chain and logistics pressures as well as higher direct selling costs associated with higher net sales and an increase in SG&A as the prior year included temporary cost savings measures implemented in response to the onset of the COVID-19 pandemic.

Global Specialty Businesses

Global Specialty Businesses represented approximately 18% of the Company's consolidated net sales in 2021. The segment's net sales were $320.2 million, an increase of $51.2 million or 19% compared to 2020. The increase in net sales was driven by increases in selling price and product mix, including Norman Hay, of 14%, additional net sales from acquisitions of 8%, and the positive impact of foreign currency translation of 2% partially offset by volume declines of approximately 5%. Both the changes in selling price and product mix and sales volumes were primarily driven by higher amounts of shipments of a lower priced product in the Company's mining business in the prior year. The foreign exchange impact was a result of similar strengthening of certain currencies in EMEA and Americas as described above. This segment's operating earnings were $90.6 million, an increase of $10.9 million or 14% compared to 2020. The increase in segment operating earnings reflects the higher net sales, described above, partially offset by lower gross margins in the current year coupled with higher SG&A, including an increase in direct selling costs associated with higher net sales, SG&A from acquisitions and an increase in SG&A as the prior year included temporary cost savings measures implemented in response to the onset of the COVID-19 pandemic.

Reportable Segments Review — Comparison of 2020 with 2019

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, 2019. Excluding net sales from acquisitions, the segment's net sales decreased by approximately 16% due to lower volumes of 12% and a negative impact of foreign currency translation of 4%. The 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 sales volumes and higher COGS and SG&A due to seven additional months of Houghton in 2020.

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, 2019. 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 sales volumes and higher COGS and SG&A due to seven additional months of Houghton in 2020.

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, 2019. 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 of 2020 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 sales volumes and higher COGS and SG&A due to seven additional months of Houghton in 2020.

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, 2019 and the

Norman Hay acquisition closed on October 1, 2019. 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 2019. 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 2020.

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. Such testing began in 2020 and continued into 2021. As of December 31, 2021, 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, 2021, 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.

The Company is party to environmental matters related to certain domestic and foreign properties. The Company'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 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 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. The Company 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 27 years, has estimated the present value range of costs for these environmental matters, on a discounted basis, to be between approximately $5.0 million and $6.0 million as of December 31, 2021, for which $5.6 million is accrued within other accrued liabilities and other non-current liabilities on the Company's Consolidated Balance Sheet as of December 31, 2021. Comparatively, as of December 31, 2020, the Company had $6.0 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 $0.4 million and $0.1 million were accrued as of December 31, 2021 and 2020, 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, 2020.

Interest Rate Risk. The Company's exposure to changes in interest rates relates primarily to its borrowings under the Credit Facility. Borrowings under the Credit Facility bear interest at a specified benchmark plus an applicable margin based upon the Company's consolidated net leverage ratio and the currency of the borrowing. In December 2021, the Company entered into the Second Amendment to provide an update for the use of a non-USD currency LIBOR successor rate. At this time, it remains uncertain what rate will succeed LIBOR for loans denominated in U.S. dollars. As a result of the variable interest rates applicable under the Credit Facility, including with respect to any future successor rate 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, 2021, the Company had outstanding borrowings under the Credit Facility of approximately $889.6 million. The variable interest rate incurred on the outstanding borrowings under the Credit Facility during the year ended December 31, 2021 was approximately 1.6%. If interest rates had changed by 10% during 2021, the Company's interest expense for the period ended December 31, 2021 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, 2021, 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 2021 revenues and pre-tax earnings would have correspondingly decreased or increased by approximately $98.8 million and $11.7 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 $17.6 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 $0.7 million, $3.6 million and $1.9 million for the years ended December 31, 2021, 2020 and 2019, 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 $0.1 million, $0.4 million and $0.2 million for the years ended December 31, 2021, 2020 and 2019, respectively.

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

QUAKER CHEMICAL CORPORATION
INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

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, 2021 and 2020, 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, 2021, 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, 2021, 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, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control — Integrated Framework (2013) issued by the COSO.

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 on Internal Control over Financial Reporting appearing under Item 9A. 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 Baron Industries and Grindaix GmbH from its assessment of internal control over financial reporting as of December 31, 2021 because they were acquired by the Company in purchase business combinations during 2021. We have also excluded Baron Industries and Grindaix from our audit of internal control over financial reporting.

Baron Industries and Grindaix are wholly-owned subsidiaries whose total assets and total revenues excluded from management's assessment and our audit of internal control over financial reporting for each entity represent less than 1% of the related consolidated financial statement amounts as of and for the year ended December 31, 2021.

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 – Annual Impairment Assessment

As described in Note 16 to the consolidated financial statements, the Company's consolidated other intangible assets, net balance was $1,027.8 million as of December 31, 2021, and the indefinite-lived intangible asset was $196.9 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 possible impairment. Management completed its annual impairment assessment during the fourth quarter of 2021 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 weighted average cost of capital 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 annual impairment assessment is a critical audit matter are (i) the significant judgment by management when determining the fair value 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 royalty rate, 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 annual impairment assessment, 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 method; and (iv) evaluating the reasonableness of significant assumptions related to the royalty rate, revenue growth rates and terminal growth rates. Evaluating management's assumptions related to the royalty rate, 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 the evaluation of the relief from royalty valuation method and the royalty rate assumption.

/s/ PricewaterhouseCoopers LLP
Philadelphia, Pennsylvania
March 1, 2022

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,		
	2021	2020	2019
Net sales	$1,761,158	$1,417,677	$1,133,503
Cost of goods sold (excluding amortization expense — See Note 16)	1,166,518	904,234	741,386
Gross profit	594,640	513,443	392,117
Selling, general and administrative expenses	418,856	380,752	283,828
Indefinite-lived intangible asset impairment	—	38,000	—
Restructuring and related charges	1,433	5,541	26,678
Combination, integration and other acquisition-related expenses	23,885	29,790	35,477
Operating income	150,466	59,360	46,134
Other income (expense), net	18,851	(5,618)	(254)
Interest expense, net	(22,326)	(26,603)	(16,976)
Income before taxes and equity in net income of associated companies	146,991	27,139	28,904
Taxes on income before equity in net income of associated companies	34,939	(5,296)	2,084
Income before equity in net income of associated companies	112,052	32,435	26,820
Equity in net income of associated companies	9,379	7,352	5,064
Net income	121,431	39,787	31,884
Less: Net income attributable to noncontrolling interest	62	129	262
Net income attributable to Quaker Chemical Corporation	$ 121,369	$ 39,658	$ 31,622
Per share data:			
Net income attributable to Quaker Chemical Corporation common shareholders — basic	$ 6.79	$ 2.23	$ 2.08
Net income attributable to Quaker Chemical Corporation common shareholders — diluted	$ 6.77	$ 2.22	$ 2.08

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,		
	2021	**2020**	**2019**
Net income	$121,431	$39,787	$31,884
Other comprehensive (loss) income, net of tax			
Currency translation adjustments	(46,952)	41,601	4,779
Defined benefit retirement plans			
Net gain (loss) arising during the period, other	9,210	8,827	(6,289)
Amortization of actuarial loss	1,078	2,308	2,458
Amortization of prior service gain	7	(69)	(151)
Current period change in fair value of derivatives	2,226	(3,278)	(320)
Unrealized (loss) gain on available-for-sale securities	(2,945)	2,091	2,093
Other comprehensive (loss) income	(37,376)	51,480	2,570
Comprehensive income	84,055	91,267	34,454
Less: Comprehensive income attributable to noncontrolling interest	(78)	(37)	(287)
Comprehensive income attributable to Quaker Chemical Corporation	$83,977	$91,230	$34,167

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

QUAKER CHEMICAL CORPORATION
CONSOLIDATED BALANCE SHEETS
(Dollars in thousands, except par value)

	December 31, 2021	December 31, 2020
ASSETS		
Current assets		
Cash and cash equivalents	$ 165,176	$ 181,833
Accounts receivable, net	430,676	372,974
Inventories, net	264,531	187,764
Prepaid expenses and other current assets	59,871	50,156
Total current assets	920,254	792,727
Property, plant and equipment, net	197,520	203,883
Right of use lease assets	36,635	38,507
Goodwill	631,194	631,212
Other intangible assets, net	1,027,782	1,081,358
Investments in associated companies	95,278	95,785
Deferred tax assets	16,138	16,566
Other non-current assets	30,959	31,796
Total assets	$2,955,760	$2,891,834
LIABILITIES AND EQUITY		
Current liabilities		
Short-term borrowings and current portion of long-term debt	$ 56,935	$ 38,967
Accounts payable	226,656	191,821
Dividends payable	7,427	7,051
Accrued compensation	38,197	43,300
Accrued restructuring	4,087	8,248
Accrued pension and postretirement benefits	1,548	1,466
Other accrued liabilities	95,617	92,107
Total current liabilities	430,467	382,960
Long-term debt	836,412	849,068
Long-term lease liabilities	26,335	27,070
Deferred tax liabilities	179,025	192,763
Non-current accrued pension and postretirement benefits	45,984	63,890
Other non-current liabilities	49,615	55,169
Total liabilities	1,567,838	1,570,920
Commitments and contingencies (Note 26)		
Equity		
Common stock, $1 par value; authorized 30,000,000 shares; issued and outstanding 2021 — 17,897,033 shares; 2020 — 17,850,616 shares	17,897	17,851
Capital in excess of par value	917,053	905,171
Retained earnings	516,334	423,940
Accumulated other comprehensive loss	(63,990)	(26,598)
Total Quaker shareholders' equity	1,387,294	1,320,364
Noncontrolling interest	628	550
Total equity	1,387,922	1,320,914
Total liabilities and equity	$2,955,760	$2,891,834

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,		
	2021	**2020**	**2019**
Cash flows from operating activities			
Net income	$121,431	$ 39,787	$ 31,884
Adjustments to reconcile net income to net cash provided by operating activities:			
Amortization of debt issuance costs	4,749	4,749	1,979
Depreciation and amortization	86,550	83,246	44,895
Equity in undistributed earnings of associated companies, net of dividends	(8,971)	4,862	(2,115)
Acquisition-related fair value adjustments related to inventory	801	229	11,714
Deferred income taxes	(12,506)	(38,281)	(24,242)
Uncertain tax positions (non-deferred portion)	(922)	1,075	958
Non-current income taxes payable	—	—	856
Deferred compensation and other, net	(5,325)	(471)	(6,789)
Share-based compensation	11,038	10,996	4,861
(Gain) loss on disposal of property, plant, equipment and other assets	(4,695)	871	(58)
Insurance settlement realized	—	(1,035)	(822)
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	(1,974)	860	(14,414)
Restructuring and related charges	1,433	5,541	26,678
Pension and other postretirement benefits	(6,330)	16,535	46
(Decrease) increase in cash from changes in current assets and current liabilities, net of acquisitions:			
Accounts receivable	(67,473)	17,170	19,926
Inventories	(84,428)	(3,854)	10,844
Prepaid expenses and other current assets	(21,174)	927	(4,640)
Change in restructuring liabilities	(5,266)	(15,745)	(8,899)
Accounts payable and accrued liabilities	37,998	22,308	(8,915)
Estimated taxes on income	3,997	8,763	(1,373)
Net cash provided by operating activities	48,933	178,389	82,374
Cash flows from investing activities			
Investments in property, plant and equipment	(21,457)	(17,901)	(15,545)
Payments related to acquisitions, net of cash acquired	(42,417)	(56,230)	(893,412)
Proceeds from disposition of assets	14,744	2,702	103
Insurance settlement interest earned	—	44	222
Net cash used in investing activities	(49,130)	(71,385)	(908,632)
Cash flows from financing activities			
Payments of long-term debt	(38,011)	(37,615)	—
Proceeds from term loan debt	—	—	750,000
Borrowings (repayments) on revolving credit facilities, net	53,031	(11,485)	147,135
Repayments on other debt, net	(776)	(661)	(8,798)
Financing-related debt issuance costs	—	—	(23,747)
Dividends paid	(28,599)	(27,563)	(21,830)
Stock options exercised, other	890	3,867	1,370
Purchase of noncontrolling interest in affiliates	—	(1,047)	—
Distributions to noncontrolling affiliate shareholders	—	(751)	—
Net cash (used in) provided by financing activities	(13,465)	(75,255)	844,130
Effect of foreign exchange rate changes on cash	(3,057)	6,591	1,258
Net (decrease) increase in cash, cash equivalents and restricted cash	(16,719)	38,340	19,130
Cash, cash equivalents and restricted cash at the beginning of the period	181,895	143,555	124,425
Cash, cash equivalents and restricted cash at the end of the period	$165,176	$181,895	$ 143,555
Supplemental cash flow disclosures:			
Cash paid during the year for:			
Income taxes, net of refunds	$ 34,775	$ 20,253	$ 15,499
Interest	19,298	23,653	19,553
Non-cash activities:			
Change in accrued purchases of property, plant and equipment, net	$ 2,132	$ (1,376)	$ 1,978

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, 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 (loss)	—	—	—	51,572	(92)	51,480
Dividends declared ($1.56 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
Net income	—	—	121,369	—	62	121,431
Amounts reported in other comprehensive (loss) income	—	—	—	(37,392)	16	(37,376)
Dividends declared ($1.62 per share)	—	—	(28,975)	—	—	(28,975)
Shares issued upon exercise of stock options and other	17	1,677	—	—	—	1,694
Share-based compensation plans	29	10,205	—	—	—	10,234
Balance as of December 31, 2021	$17,897	$917,053	$516,334	$(63,990)	$628	$1,387,922

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.

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.

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.

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.

Right of use lease assets and lease liabilities: 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 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 accrued 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 Property, plant and equipment ("PP&E"), current portion of long-term debt and long-term debt on the Consolidated Balance Sheet.

Long-lived assets: PP&E is 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 $3.6 million and $2.3 million of net costs were capitalized in PP&E on the Company's Consolidated Balance Sheets at December 31, 2021 and 2020, 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 3 to 24 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.

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.

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 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.

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. Therefore, 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. 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.

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.

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.

See Note 5 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 $44.9 million, $40.0 million and $32.1 million for the years ended December 31, 2021, 2020 and 2019, 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, 2021 and 2020, 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 measurement date for the Company's 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 (the "Board"), 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, 2021 and 2020, 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 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 assesses the Company's 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.

Based on various indices or index compilations 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 of, and for the year ended December 31, 2021, 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, 2021, 2020 and 2019, the Company recorded $0.6 million, $0.4 million, and $1.0 million, respectively, of remeasurement losses associated with the applicable currency conversions related to 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

2021 Acquisitions

In November 2021, the Company acquired Baron Industries ("Baron"), a privately held Company that provides vacuum impregnation services of castings, powder metals and electrical components for its Global Specialty Businesses reportable segment for $11.0 million, including an initial cash payment of $7.1 million, subject to post-closing adjustments as well as certain earn-out provisions currently estimated at $3.9 million that are payable at different times from 2022 through 2025. The earn-out provisions could total a maximum of $4.5 million. The Company allocated $8.0 million of the purchase price to intangible assets, $1.1 million of property, plant and equipment and $1.5 million of other assets acquired net of liabilities assumed, which includes $0.3 million of cash acquired. In addition, the Company recorded $0.4 million of goodwill, none of which is expected to be tax deductible. Intangible assets comprised $7.2 million of customer relationships to be amortized over 15 years; and $0.8 million of existing product technology to be amortized over 13 years.

In November 2021, the Company acquired a business that provides hydraulic fluids, coolants, cleaners, and rust preventative oils in Turkey for its EMEA reportable segment for 3.2 million EUR or approximately $3.7 million.

In September 2021, the Company acquired the remaining interest in Grindaix-GmbH ("Grindaix"), a Germany-based, high-tech provider of coolant control and delivery systems for its Global Specialty Businesses reportable segment for 2.4 million EUR or approximately $2.9 million, which is gross of approximately $0.3 million of cash acquired. Previously, in February 2021, the Company acquired a 38% ownership interest in Grindaix for 1.4 million EUR or approximately $1.7 million. The Company recorded its initial investment as an equity method investment within the Condensed Consolidated Financial Statements and accounted for the purchase of the remaining interest as a step acquisition whereby the Company remeasured the previously held equity method investment to its fair value.

In June 2021, the Company acquired certain assets for its chemical milling maskants product line in the Global Specialty Businesses reportable segment for 2.3 million EUR or approximately $2.8 million.

In February 2021, the Company acquired a tin-plating solutions business for the steel end market for $25.0 million. This acquisition is part of each of the Company's geographic reportable segments. The Company allocated $19.6 million of the purchase price to intangible assets, comprised of $18.3 million of customer relationships, to be amortized over 19 years; $0.9 million of existing product technology to be amortized over 14 years; and $0.4 million of a licensed trademark to be amortized over 3 years. In addition, the Company recorded $5.0 million of goodwill, all of which is expected to be tax deductible in various jurisdictions in which we operate. Factors contributing to the purchase price that resulted in goodwill included the acquisition of business processes and personnel that will allow Quaker Houghton to better serve its customers.

As of December 31, 2021, the allocation of the purchase price of the 2021 acquisitions has not been finalized and the one year measurement period has not ended for any of these acquisitions. 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 results of operations of the 2021 acquired assets and businesses subsequent to the respective acquisition dates are included in the Consolidated Statements of Income for the year ended December 31, 2021. Applicable transaction expenses associated with these acquisitions 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 the acquired assets and businesses are not considered material to the overall operations of the Company for the periods presented.

2022 Acquisitions

In January 2022, the Company acquired a business related to the sealing and impregnation of metal castings for the automotive sector, as well as impregnation resin and impregnation systems for metal parts, for its Global Specialty Business reporting segment for approximately 1.2 million EUR or approximately $1.4 million. This business expands the Company's geographic presence in Germany as well as broadens its product offerings and service capabilities within its existing impregnation business that was initially entered into as part of its past acquisition of Norman Hay. Also in in January 2022, the Company acquired a business that provides pickling inhibitor technologies for the steel industry, drawing lubricants and stamping oil for metalworking, and various other lubrication, rust preventative, and cleaner applications, for its Americas reportable segment for approximately $8.0 million. This business broadens the Company's product offerings within its existing metals and metalworking business in the Americas region.

(Dollars in thousands, except per share amounts, unless otherwise stated)

The results of operations of these two January 2022 acquisitions are not included in the Consolidated Statements of Income because the date of closing for each was subsequent to December 31, 2021. Preliminary purchase price allocation of assets acquired and liabilities assumed have not been presented as that information is not available as of the date of these Consolidated Financial Statements.

Houghton

In August 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.

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 year ending December 31, 2019**
Net sales	$1,562,427
Net income attributable to Quaker Chemical Corporation	94,537

Combination, integration and other acquisition-related expenses have been and are expected to continue to be significant. The Company incurred total costs of $18.6 million, $30.3 million and $38.0 million for the years ended December 31, 2021, 2020 and 2019, respectively, related to the Combination, integration and other acquisition-related activities. These costs included certain legal, financial and other advisory and consultant costs incurred in connection with post-closing integration activities including internal control readiness and remediation, as well as due diligence, regulatory approvals and closing the Combination. These costs also included interest costs to maintain the bank commitment ("ticking fees") for the Combination during the year ended December 31, 2019, accelerated depreciation charges during the years ended December 31, 2021, 2020 and 2019, a gain on the sale of a held-for-sale real property during the year ended December 31, 2021, a loss on the sale of a held-for-sale asset during the year ended December 31, 2020, and recorded income related to indemnification rights during the years ended December 31, 2021 and 2020. As of December 31, 2021 and 2020, the Company had current liabilities related to the Combination and other acquisition-related activities of $5.5 million and $7.5 million, respectively, primarily recorded within other accrued liabilities on its Consolidated Balance Sheets.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Other Previous Acquisitions

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 final estimated fair values of Coral net assets acquired:

	December 22, 2020 (1)	Measurement Period Adjustments	December 22, 2020 (as adjusted)
Cash and cash equivalents	$ 958	$ —	$ 958
Accounts receivable	8,473	—	8,473
Inventories	4,527	—	4,527
Prepaid expenses and other assets	181	—	181
Property, plant and equipment	10,467	652	11,119
Intangible assets	30,300	(500)	29,800
Goodwill	2,814	804	3,618
Total assets purchased	57,720	956	58,676
Long-term debt including current portions and finance leases	183	556	739
Accounts payable, accrued expenses and other accrued liabilities	3,482	—	3,482
Total liabilities assumed	3,665	556	4,221
Total consideration paid for Coral	54,055	400	54,455
Less: estimated purchase price settlement	—	400	400
Less: cash acquired	958	—	958
Net cash paid for Coral	$53,097	$ —	$53,097

(1) As previously disclosed in the Company's 2020 Form 10-K.

Measurement period adjustments recorded during the year ended December 31, 2021 include certain adjustments related to refining original estimates for assets and liabilities for certain acquired finance leases, as well as an adjustment to reflect the expected settlement of post-closing working capital and net indebtedness true ups to the initial purchase price. The Company continues to work with the seller to finalize certain post-closing adjustments and the above table includes the Company's best estimate as of December 31, 2021. As of December 31, 2021, the allocation of the purchase price for Coral has been finalized and the one year measurement period has ended.

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 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. As of December 31, 2021, the allocation of the purchase price of TEL was finalized and the one year measurement period ended.

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 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 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 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.

Note 3 — Recently Issued Accounting Standards

Recently Issued Accounting Standards Adopted

The Financial Accounting Standards Board ("FASB") issued Account Standards Update ("ASU") ASU 2019-12*, Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* in December 2019 to simplify the accounting for income taxes. 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. The Company adopted this standard, as required, effective January 1, 2021. There was no cumulative effect of adoption recorded within retained earnings on January 1, 2021.

The FASB issued ASU 2020-04*, Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting* in March 2020. The FASB subsequently issued ASU 2021-01*,* *Reference Rate Reform (Topic 848): Scope* in January 2021 which clarified the guidance but did not materially change the guidance or its applicability to the Company. The amendments provide temporary optional expedients and exceptions for applying U.S. 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. On December 10, 2021, the Company entered into a Second Amendment to Credit Agreement ("Second Amendment") with Bank of America N.A., an update to provide for the use of a non-USD currency LIBOR successor rate. The Company elected to apply the expedients provided in ASU 2020-04 with respect to the Second Amendment. The Company will continue to monitor for potential impacts related to its USD-based LIBOR rates. See Note 20 of Notes to Consolidated Financial Statements..

(Dollars in thousands, except per share amounts, unless otherwise stated)

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 assesses the Company's performance. The Company has four reportable 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, 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 income (expense), net.

The following tables present information about the performance of the Company's reportable segments for the years ended December 31, 2021, 2020 and 2019.

	2021	2020	2019
Net sales			
Americas	$ 572,643	$ 450,161	$ 392,121
EMEA	480,126	383,187	285,570
Asia/Pacific	388,160	315,299	247,839
Global Specialty Businesses	320,229	269,030	207,973
Total net sales	$1,761,158	$1,417,677	$1,133,503

(Dollars in thousands, except per share amounts, unless otherwise stated)

	2021	2020	2019
Segment operating earnings			
Americas	$ 124,863	$ 96,379	$ 78,297
EMEA	85,209	69,163	47,014
Asia/Pacific	96,318	88,356	67,512
Global Specialty Businesses	90,632	79,690	58,881
Total segment operating earnings	397,022	333,588	251,704
Combination, integration and other acquisition-related expenses	(23,885)	(29,790)	(35,477)
Restructuring and related charges	(1,433)	(5,541)	(26,678)
Fair value step up of acquired inventory sold	(801)	(226)	(11,714)
Indefinite-lived intangible asset impairment	—	(38,000)	—
Non-operating and administrative expenses	(157,864)	(143,202)	(104,572)
Depreciation of corporate assets and amortization	(62,573)	(57,469)	(27,129)
Operating income	150,466	59,360	46,134
Other income (expense), net	18,851	(5,618)	(254)
Interest expense, net	(22,326)	(26,603)	(16,976)
Income before taxes and equity in net income of associated companies	**$ 146,991**	**$ 27,139**	**$ 28,904**

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, as of December 31, 2021, 2020 and 2019:

	2021	2020	2019
Segment assets			
Americas	$ 983,521	$ 969,551	$ 926,122
EMEA	714,659	697,821	688,663
Asia/Pacific	750,970	713,004	685,476
Global Specialty Businesses	506,610	511,458	550,055
Total segment assets	$2,955,760	$2,891,834	$2,850,316

	2021	2020	2019
Segment long-lived assets			
Americas	$ 129,321	$ 122,302	$ 139,170
EMEA	69,990	69,344	56,108
Asia/Pacific	123,130	119,233	126,166
Global Specialty Businesses	37,951	59,091	69,184
Total segment long-lived assets	$ 360,392	$ 369,970	$ 390,628

(Dollars in thousands, except per share amounts, unless otherwise stated)

The following tables present information regarding the Company's reportable segments' capital expenditures and depreciation for identifiable assets for the years ended December 31, 2021, 2020 and 2019:

	2021	2020	2019
Capital expenditures			
Americas	$ 9,678	$ 6,451	$ 6,404
EMEA	6,767	3,844	3,263
Asia/Pacific	2,264	5,688	3,857
Global Specialty Businesses	2,748	1,918	2,021
Total segment capital expenditures	$ 21,457	$ 17,901	$ 15,545

	2021	2020	2019
Depreciation			
Americas	$ 12,074	$ 12,322	$ 7,500
EMEA	6,936	6,813	4,560
Asia/Pacific	4,596	4,672	3,458
Global Specialty Businesses	3,043	3,544	2,248
Total segment depreciation	$ 26,649	$ 27,351	$ 17,766

During the years ended December 31, 2021, 2020 and 2019, the Company had approximately $1,198.4 million, $963.2 million and $719.8 million of net sales, respectively, attributable to non-U.S. operations. As of December 31, 2021, 2020 and 2019, the Company had approximately $155.2 million, $176.6 million and $174.4 million of long-lived assets, respectively, attributable to non-U.S. operations.

Inter-segment revenue for the years ended December 31, 2021, 2020 and 2019 was $12.2 million, $9.1 million and $7.3 million for Americas, $29.0 million, $22.0 million and $20.3 million for EMEA, $1.6 million, $0.6 million and $0.2 million for Asia/Pacific and $7.4 million, $4.7 million and $5.4 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

Arrangements Resulting in Net Reporting

As part of the Company's Fluidcare™ business, certain third-party product sales to customers are managed by the Company. The Company transferred third-party products under arrangements resulting in net reporting of $71.7 million, $42.5 million and $48.0 million for the years ended December 31, 2021, 2020 and 2019, respectively.

Customer Concentration

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. During the year ended December 31, 2021, 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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Contract Assets and Liabilities

The Company had no material contract assets recorded on its Consolidated Balance Sheets as of December 31, 2021 and 2020.

The Company had approximately $7.0 million and $4.0 million of deferred revenue as of December 31, 2021 and 2020, respectively. During the years ended December 31, 2021 and 2020, 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 and 2019, 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, 2021, 2020 and 2019, 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, 2021, 2020 and 2019.

	2021	2020	2019
Metal removal fluids	23.4%	23.9%	19.9%
Rolling lubricants	22.2%	21.8%	21.9%
Hydraulic fluids	13.6%	13.3%	13.0%

	Net sales for the year ending December 31, 2021			
	Americas	EMEA	Asia/ Pacific	Consolidated Total
Customer Industries				
Metals	$210,340	$141,950	$207,160	$559,450
Metalworking and other	362,303	338,176	181,000	881,479
	572,643	480,126	388,160	1,440,929
Global Specialty Businesses	186,859	80,541	52,829	320,229
	$759,502	$560,667	$440,989	$1,761,158
Timing of Revenue Recognized				
Product sales at a point in time	$724,357	$527,083	$429,130	$1,680,570
Services transferred over time	35,145	33,584	11,859	80,588
	$759,502	$560,667	$440,989	$1,761,158

(Dollars in thousands, except per share amounts, unless otherwise stated)

	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

Note 6 — Leases

The Company has operating leases for certain facilities, vehicles and machinery and equipment with remaining lease terms up to 10 years. In addition, the Company has certain land use leases with remaining lease terms up to 94 years.

Operating lease expense is recognized on a straight-line basis over the lease term. Operating lease expense for the years ended December 31, 2021, 2020 and 2019 was $14.1 million, $14.2 million, and $9.4 million, respectively. Short-term lease expense for the years ended December 31, 2021, 2020 and 2019 was $0.9 million, $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, 2021, 2020 and 2019.

Cash paid for operating leases during the years ended December 31, 2021, 2020 and 2019 was $13.9 million, $14.1 million and $9.2 million, respectively. The Company recorded new right of use lease assets and associated lease liabilities of $11.1 million during the year ended December 31, 2021.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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

	December 31, 2021	December 31, 2020
Right of use lease assets	$36,635	$38,507
Other accrued liabilities	9,976	10,901
Long-term lease liabilities	26,335	27,070
Total operating lease liabilities	$36,311	$37,971
Weighted average remaining lease term (years)	5.6	6.0
Weighted average discount rate	4.22%	4.20%

Maturities of operating lease liabilities as of December 31, 2021 were as follows:

	December 31, 2021
For the year ended December 31, 2022	$11,346
For the year ended December 31, 2023	9,041
For the year ended December 31, 2024	7,017
For the year ended December 31, 2025	5,292
For the year ended December 31, 2026	4,197
For the year ended December 31, 2027 and beyond	4,502
Total lease payments	41,395
Less: imputed interest	(5,084)
Present value of lease liabilities	$36,311

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 400 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 2022 under the QH Program. 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, including customary and routine adjustments to initial estimates for employee separation costs, 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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Activity in the Company's accrual for restructuring under the QH Program for the years ended December 31, 2021 and 2020 is as follows:

	QH Program
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
Restructuring and related charges	1,433
Cash payments	(5,266)
Currency translation adjustments	(328)
Accrued restructuring as of December 31, 2021	$ 4,087

In connection with the plans for closure of certain manufacturing and non-manufacturing facilities, the Company has made a decision to make available for sale certain facilities. During the years ended December 31, 2021 and 2020, certain of these facilities were sold and the Company recognized a gain of $5.4 million in 2021 and a loss of approximately $0.6 million in 2020 which is included within other income (expense), net on the Consolidated Statement of Income. Additionally, certain buildings and land with an aggregate book value of approximately $0.7 million continues to be held-for-sale as of December 31, 2021 and are recorded in prepaid expenses and other current assets on the Company's Consolidated Balance Sheet. The Company will continue to evaluate for future decisions about making certain other facilities available for sale.

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, 2021, 2020 and 2019:

	2021	2020	2019
Stock options	$1,235	$1,491	$1,448
Non-vested stock awards and restricted stock units	5,438	5,012	3,206
Non-elective and elective 401(k) matching contribution in stock	1,553	3,112	—
Employee stock purchase plan	—	—	84
Director stock ownership plan	901	541	123
Performance stock units	1,911	840	—
Total share-based compensation expense	$11,038	$10,996	$4,861

Share-based compensation expense is recorded in SG&A, except for $0.9 million, $1.5 million and $0.9 million during the years ended December 31, 2021, 2020 and 2019, respectively, recorded within Combination, integration and other acquisition-related expenses.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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, 2021	110,336	$143.51		
Options granted	25,250	245.17		
Options exercised	(22,540)	143.49		
Options forfeited	(3,362)	190.65		
Options outstanding as of December 31, 2021	109,684	$165.47	4.8	$7,550
Options expected to vest after December 31, 2021	67,680	$178.10	5.4	$3,929
Options exercisable as of December 31, 2021	42,004	$145.12	3.9	$3,621

The total intrinsic value of options exercised during the years ended December 31, 2021, 2020 and 2019 was approximately $2.7 million, $6.5 million and $2.5 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, 2021 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)
$ 49.01 — $ 80.00	711	—	$ 72.12	711	$ 72.12
$ 80.01 — $100.00	1,309	—	87.30	1,309	87.30
$120.01 — $150.00	43,482	5.2	136.62	12,873	136.59
$150.01 — $180.00	40,593	3.7	154.23	27,111	153.88
$220.01 — $250.00	23,589	6.2	245.15	—	—
	109,684	4.8	165.47	42,004	145.12

As of December 31, 2021, unrecognized compensation expense related to options granted in 2021, 2020 and 2019 was $1.8 million, $1.2 million and $0.3 million, respectively, to be recognized over a weighted average period of 1.9 years.

(Dollars in thousands, except per share amounts, unless otherwise stated)

The Company granted stock options under its LTIP plan that are subject only to time vesting generally over a three year period during 2021, 2020, 2019 and 2018. For the purposes of determining the fair value of stock option awards, the Company used a Black-Scholes option pricing model and primarily used the assumptions set forth in the table below:

	2021	2020	2019	2018
Number of stock options granted	25,250	49,115	51,610	35,842
Dividend yield	0.85%	0.99%	1.12%	1.37%
Expected volatility	37.33%	31.57%	26.29%	24.73%
Risk-free interest rate	0.60%	0.36%	1.52%	2.54%
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, 2021, 2020 and 2019, respectively, is as follows:

	2021	2020	2019
2021 Stock option awards	$429	$—	$—
2020 Stock option awards	516	385	—
2019 Stock option awards	234	698	665
2018 Stock option awards	56	357	364
2017 Stock option awards	—	51	369

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, 2020	71,768	$151.17
Granted	23,536	242.29
Vested	(23,638)	157.63
Forfeited	(2,973)	172.15
Nonvested awards, December 31, 2021	68,693	$179.26

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, 2021, unrecognized compensation expense related to these awards was $5.1 million, to be recognized over a weighted average remaining period of 1.5 years.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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, 2020	10,845	$147.70
Granted	2,791	245.49
Vested	(2,570)	155.34
Forfeited	(89)	141.77
Nonvested awards, December 31, 2021	10,977	$170.82

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, 2021, unrecognized compensation expense related to these awards was $0.8 million, to be recognized over a weighted average remaining period of 1.8 years.

Performance Stock Units

The Company grants 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 generally from January 1 of the year of grant through December 31 of the year prior to issuances of the shares upon settlement.

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 set forth in the table below:

	CEO Grant 2021 (1)	2021	2020
Fully vested shares	3,775	12,103	18,485
Risk-free interest rate	0.65%	0.29%	0.28%
Dividend yield	0.72%	0.64%	1.13%
Expected term (years)	3.0	3.0	3.0

(1) On September 2, 2021, the Board appointed Andrew Tometich to serve as CEO and entered into an Employment Agreement, and granted an equity award consisting of a mix of time-based restricted stock and PSUs.

As of December 31, 2021, there was approximately $4.3 million of total unrecognized compensation cost related to PSUs which the Company expects to recognize over a weighted-average period of 1.4 years.

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. Beginning in April 2020 and continuing through March 2021, the Company matched both non-elective and elective 401(k) contributions in fully vested shares of the Company's common stock rather than cash. For the years ended December 31, 2021, and 2020, total contributions were $1.5 million and $3.1 million, respectively.

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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Note 9 — Other Income (Expense), net

Other income (expense), net, for the years ended December 31, 2021, 2020 and 2019 are as follows:

	2021	2020	2019
Income from third party license fees	$ 1,367	$ 999	$ 1,035
Foreign exchange (losses) gains, net	(3,821)	(6,082)	223
Gain (loss) on disposals of property, plant, equipment and other assets, net	4,695	(871)	58
Non-income tax refunds and other related credits	15,155	3,345	1,118
Pension and postretirement benefit income (costs), non-service components	759	(21,592)	(2,805)
Gain on changes in insurance settlement restrictions of an inactive subsidiary and related insurance insolvency recovery	—	18,144	60
Other non-operating income, net	696	439	57
Total other income (expense), net	$18,851	$ (5,618)	$ (254)

Gain (loss) on disposals of property, plant, equipment and other assets, net, includes losses related to certain fixed assets disposals resulting from the property damage caused by flooding of the Company's Conshohocken, Pennsylvania headquarters in 2021, described in Note 26 of Notes to Consolidated Financial Statements, as well as a gain in 2021 and a loss in 2020 on the sale of certain held-for-sale real property assets related to the Combination, described in Note 7 of Notes to Consolidated Financial Statements. Non-income tax refunds and other related credits during the year ended December 31, 2021 includes certain non-income tax credits for the Company's Brazilian subsidiaries described in Note 26 of Notes to Consolidated Financial Statements. Pension and postretirement benefit income (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 settlement 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, 2021, 2020 and 2019, include foreign currency transaction losses of approximately $0.6 million, $0.4 million and $1.0 million, respectively, related to hyper-inflationary accounting for the Company's Argentine subsidiaries. See Note 1 of Notes to Consolidated Financial Statements.

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 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, 2021, $7.0 million in installments have been paid with the remaining $8.5 million to be paid through installments in future years.

(Dollars in thousands, except per share amounts, unless otherwise stated)

As of December 31, 2021, the Company has a deferred tax liability of $8.4 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, 2021, 2020 and 2019 are as follows:

	2021	2020	2019
Current:			
Federal	$ 955	$ (1,359)	$ (239)
State	2,115	1,171	352
Foreign	44,375	33,173	26,213
	47,445	32,985	26,326
Deferred:			
Federal	(3,863)	(28,437)	(9,267)
State	(3,117)	(3,087)	(396)
Foreign	(5,526)	(6,757)	(14,579)
Total	$34,939	$ (5,296)	$ 2,084

The components of earnings before income taxes for the years ended December 31, 2021, 2020 and 2019 are as follows:

	2021	2020	2019
U.S.	$ 7,263	$(66,585)	$(46,697)
Foreign	139,728	93,724	75,601
Total	$146,991	$ 27,139	$ 28,904

(Dollars in thousands, except per share amounts, unless otherwise stated)

Total deferred tax assets and liabilities are composed of the following as of December 31, 2021 and 2020:

	2021	2020
Retirement benefits	$ 11,860	$ 15,237
Allowance for doubtful accounts	2,155	2,316
Insurance and litigation reserves	675	842
Performance incentives	2,881	5,914
Equity-based compensation	1,920	1,282
Prepaid expense	460	756
Operating loss carryforward	18,544	16,693
Foreign tax credit and other credits	16,285	24,873
Interest	9,940	16,812
Restructuring reserves	631	1,121
Right of use lease assets	8,322	9,346
Inventory reserves	2,941	2,225
Research and development	8,832	7,974
Other	2,846	3,005
	88,292	108,396
Valuation allowance	(17,400)	(21,511)
Total deferred tax assets, net	$70,892	$86,885
Depreciation	11,580	15,473
Foreign pension and other	2,332	1,807
Intangibles	197,066	222,794
Lease liabilities	8,421	9,151
Outside basis in equity investment	5,999	7,938
Unremitted Earnings	8,381	5,919
Total deferred tax liabilities	$233,779	$263,082

The Company has $10.6 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 $2.6 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 $2.6 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 $0.5 million of valuation allowance was established for other net state deferred tax assets.

The Company has $8.0 million of deferred tax assets related to foreign net operating loss carryforwards. A partial valuation allowance of $2.5 million has been established against the $8.0 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. 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. The Company had a foreign tax credit carry forward of $15.9 million and $24.9 million as of December 31, 2021 and 2020, respectively, with a $5.8 million and $10.2 million valuation allowance as of December 31, 2021 and 2020, respectively, reflecting the amount of credits that are not expected to be utilized before expiration.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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, 2021, the Company had a net realizable disallowed interest carryforward of $9.4 million on its balance sheet.

As of December 31, 2021, the Company had deferred tax liabilities of $178.0 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 $6.0 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, 2021, 2020 and 2019:

	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, 2021	$21,511	$ —	$ 29	$(4,470)	$330	$17,400
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

The Company’s net deferred tax assets and liabilities are classified in the Consolidated Balance Sheets as of December 31, 2021 and 2020 as follows:

	2021	2020
Non-current deferred tax assets	$ 16,138	$ 16,566
Non-current deferred tax liabilities	179,025	192,763
Net deferred tax liability	$(162,887)	$(176,197)

(Dollars in thousands, except per share amounts, unless otherwise stated)

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, 2021, 2020 and 2019. Certain immaterial reclassifications within the presentation of the reconciliation of income taxes have been made to the years ended December 31, 2020 and 2019:

	2021	2020	2019
Income tax provision at the Federal statutory tax rate	$ 30,868	$ 5,699	$ 6,070
Unremitted earnings	1,841	(2,308)	(4,383)
Tax law changes / reform	1,955	(1,059)	(416)
U.S. tax on foreign operations	10,479	5,140	574
Pension settlement	—	(2,247)	—
Foreign derived intangible income	(8,698)	(7,339)	(1,699)
Non-deductible acquisition expenses	129	131	1,743
Withholding taxes	6,584	7,809	8,621
Foreign tax credits	(14,725)	(4,699)	(3,787)
Share-based compensation	600	335	(540)
Foreign tax rate differential	3,090	1,139	1,444
Research and development credit	(1,685)	(1,018)	(830)
Uncertain tax positions	519	1,990	899
State income tax provisions, net	(1,446)	(2,245)	(117)
Non-deductible meals and entertainment	426	290	318
Intercompany transfer of intangible assets	4,347	(4,384)	(5,318)
Miscellaneous items, net	655	(2,530)	(495)
Taxes on income before equity in net income of associated companies	$ 34,939	$(5,296)	$ 2,084

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, 2021, the Company has a deferred tax liability $8.4 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 intention 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, 2021 was approximately $377.4 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, 2021, the Company's cumulative liability for gross unrecognized tax benefits was $22.5 million. The Company had accrued approximately $3.1 million for cumulative penalties and $3.1 million for cumulative interest as of December 31, 2021. 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.

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 a benefit of $0.5 million for penalties and an expense of

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$0.3 million for interest (net of expirations and settlements) in its Consolidated Statement of Income for the year ended December 31, 2021, 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, and 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.

The Company estimates that during the year ending December 31, 2022, it will reduce its cumulative liability for gross unrecognized tax benefits by approximately $2.3 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, 2022.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits for the years ended December 31, 2021, 2020 and 2019, respectively, is as follows:

	2021	2020	2019
Unrecognized tax benefits as of January 1	$22,152	$19,097	$ 7,050
Increase (decrease) in unrecognized tax benefits taken in prior periods	1,002	2,025	(28)
Increase in unrecognized tax benefits taken in current period	2,915	3,095	1,935
Decrease in unrecognized tax benefits due to lapse of statute of limitations	(2,631)	(3,659)	(1,029)
Increase in unrecognized tax benefits due to acquisition	—	597	11,301
(Decrease) increase due to foreign exchange rates	(974)	997	(132)
Unrecognized tax benefits as of December 31	$22,464	$22,152	$19,097

The amount of net unrecognized tax benefits above that, if recognized, would impact the Company's tax expense and effective tax rate is $15.2 million, $14.7 million and $13.3 million for the years ended December 31, 2021, 2020 and 2019, 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 2007, Brazil from 2011, the Netherlands, Mexico and China from 2016, Mexico, Canada, Germany, Spain, U.S. and the United Kingdom from 2017, India from fiscal year beginning April 1, 2019 and ending March 31, 2020, 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 has 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 of December 31, 2021, the Company has received $1.6 million in refunds from the Netherlands and Spain and has an accrual for $2.4 million due to Italy. In February 2022, the Company received a settlement notice from the Italian taxing authorities confirming the amount due of $2.6 million, having granted the Company's request to utilize its remaining net operating losses to partially offset the liability. This amendment to the tax assessment is expected to result in the Company recognizing tax expense of $0.6 million in Q1 2022.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Houghton Italia, S.r.l is also involved in a corporate income tax audit with the Italian tax authorities covering tax years 2014 through 2018. As of December 31, 2021, the Company has a $5.0 million reserve for uncertain tax positions relating to matters related to this audit. Because the 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 $5.9 million indemnification receivable has also been established through purchase accounting. During the fourth quarter of 2021, the Company settled a portion of the Houghton Italia, S.r.l. corporate income tax audit with the Italian tax authorities for the tax years 2014 and 2015. The Company remains under audit for tax years 2016 through 2018 and believes it has adequate reverses for the remaining uncertain tax positions.

Houghton Deutschland GmbH is also under audit by the German tax authorities for tax years 2015 through 2017. Based on preliminary audit findings, primarily related to transfer pricing, the Company has recorded a reserve for $0.4 million as of December 31, 2021. Of this amount, $0.3 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 indemnification receivable has also been established.

Note 11 — Earnings Per Share

The following table summarizes earnings per share calculations for the years ended December 31, 2021, 2020 and 2019:

	2021	2020	2019
Basic earnings per common share			
Net income attributable to Quaker Chemical Corporation	$ 121,369	$ 39,658	$ 31,622
Less: income allocated to participating securities	(480)	(148)	(90)
Net income available to common shareholders	$ 120,889	$ 39,510	$ 31,532
Basic weighted average common shares outstanding	17,805,034	17,719,792	15,126,928
Basic earnings per common share	$ 6.79	$ 2.23	$ 2.08
Diluted earnings per common share			
Net income attributable to Quaker Chemical Corporation	$ 121,369	$ 39,658	$ 31,622
Less: income allocated to participating securities	(479)	(148)	(90)
Net income available to common shareholders	$ 120,890	$ 39,510	$ 31,532
Basic weighted average common shares outstanding	17,805,034	17,719,792	15,126,928
Effect of dilutive securities	50,090	31,087	36,243
Diluted weighted average common shares outstanding	17,855,124	17,750,879	15,163,171
Diluted earnings per common share	$ 6.77	$ 2.22	$ 2.08

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, restricted stock units and PSUs are not included in the diluted earnings per share calculation when the effect would have been anti-dilutive. The calculated amount of anti-diluted shares not included were 4,070 in 2021, 945 in 2020 and 108 in 2019.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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 that continued until the restrictions lapsed.

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 income (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. Therefore, due to these restrictions ending, there is no restricted cash for the year ended December 31, 2021. 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, 2021, 2020, 2019 and 2018:

	2021	2020	2019	2018
Cash and cash equivalents	$165,176	$181,833	$123,524	$104,147
Restricted cash included in other current assets	—	62	353	—
Restricted cash included in other assets	—	—	19,678	20,278
Cash, cash equivalents and restricted cash	$165,176	$181,895	$143,555	$124,425

Note 13 — Accounts Receivable and Allowance for Doubtful Accounts

As of December 31, 2021 and 2020, the Company had gross trade accounts receivable totaling $443.0 million and $386.1 million, respectively.

The following are changes in the allowance for doubtful accounts during the years ended December 31, 2021, 2020 and 2019:

	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, 2021	$13,145	$ 653	$ (946)	$ (518)	$12,334
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

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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Note 14 – Inventories

Inventories, net, as of December 31, 2021 and 2020 were as follows:

	2021	2020
Raw materials and supplies	$129,382	$ 86,148
Work in process, finished goods and reserves	135,149	101,616
Total inventories, net	$264,531	$187,764

Note 15 – Property, Plant and Equipment

Property, plant and equipment as of December 31, 2021 and 2020 were as follows:

	2021	2020
Land	$ 30,793	$ 33,009
Building and improvements	134,313	135,595
Machinery and equipment	252,779	246,242
Construction in progress	16,459	8,407
Property, plant and equipment, at cost	434,344	423,253
Less: accumulated depreciation	(236,824)	(219,370)
Total property, plant and equipment, net	$ 197,520	$ 203,883

As of December 31, 2021, PP&E includes $0.8 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 $0.7 million continue to be held-for-sale as of December 31, 2021 and are recorded in prepaid expenses and 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, 2021 and 2020 were as follows:

	Americas	EMEA	Asia/ Pacific	Global Specialty Businesses	Total
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
Goodwill additions	1,490	3,380	1,308	2,624	8,802
Currency translation and other adjustments	(709)	(8,022)	3,060	(3,149)	(8,820)
Balance as of December 31, 2021	$214,023	$135,520	$162,458	$119,193	$631,194

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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Gross carrying amounts and accumulated amortization for definite-lived intangible assets as of December 31, 2021 and 2020 were as follows:

	Gross Carrying Amount		Accumulated Amortization	
	2021	2020	2021	2020
Customer lists and rights to sell	$853,122	$839,551	$147,858	$99,806
Trademarks, formulations and product technology	163,974	166,448	38,747	30,483
Other	6,309	6,372	5,900	5,824
Total definite-lived intangible assets	$1,023,405	$1,012,371	$192,505	$136,113

The Company recorded $59.9 million, $55.9 million and $26.7 million of amortization expense during the years ended December 31, 2021, 2020 and 2019, 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, 2022	$59,900
For the year ended December 31, 2023	59,727
For the year ended December 31, 2024	59,138
For the year ended December 31, 2025	58,383
For the year ended December 31, 2026	58,108

The Company has four indefinite-lived intangible assets totaling $196.9 million as of December 31, 2021, including $195.8 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 $205.1 million as of December 31, 2020.

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 2021 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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Note 17 — Investments in Associated Companies

As of December 31, 2021, 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").

The carrying amount of the Company's equity investments as of December 31, 2021 was $95.3 million, which includes investments of $66.4 million in Houghton Korea; $21.5 million in Primex; $7.1 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, 2021 and 2020, 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, 2021, 2020 and 2019:

	Year Ended December 31,		
	2021	**2020**	**2019**
Houghton Korea	$3,808	$5,241	$2,337
Nippon Japan	461	853	850
Kelko Panama	154	107	55
Grindaix (1)	(37)	—	—
Primex	4,993	1,151	1,822
Total equity in net income of associated companies	$9,379	$7,352	$5,064

(1) In February 2021, the Company acquired a 38% ownership interest in Grindaix. From that date through September 2021 when the Company purchased the remaining interest of Grindaix, the Company accounted for its 38% interest under the equity method of accounting and recorded equity in net income of associated companies. See Note 2 of Notes to Consolidated Financial Statements.

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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Note 18 — Other Non-Current Assets

Other non-current assets as of December 31, 2021 and 2020 were as follows:

	2021	2020
Pension assets	$ 7,916	$ 6,748
Uncertain tax positions	6,931	7,209
Indemnification assets	6,630	7,615
Debt issuance costs	4,267	5,919
Supplemental retirement income program	2,269	1,961
Other	2,946	2,344
Total other non-current assets	$30,959	$31,796

As of December 31, 2021 and 2020, 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, 2021 and 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, 2021 and 2020 were as follows:

	2021	2020
Non-income taxes	$23,725	$26,080
Current income taxes payable	16,642	13,124
Professional fees, legal, and acquisition-related accruals	12,264	11,437
Selling expenses and freight accruals	11,695	10,475
Short-term lease liabilities	9,976	10,901
Customer advances and sales return reserves	7,965	6,380
Interest rate swap	1,782	—
Other	11,568	13,710
Total other accrued liabilities	$95,617	$92,107

(Dollars in thousands, except per share amounts, unless otherwise stated)

Note 20 — Debt

Debt as of December 31, 2021 and 2020 includes the following:

	As of December 31, 2021		As of December 31, 2020	
	Interest Rate	Outstanding Balance	Interest Rate	Outstanding Balance
Credit Facilities:				
Revolver	1.62%	$211,955	1.65%	$160,000
U.S. Term Loan	1.65%	540,000	1.65%	570,000
EURO Term Loan	1.50%	137,616	1.50%	157,062
Industrial development bonds	5.26%	10,000	5.26%	10,000
Bank lines of credit and other debt obligations	Various	1,777	Various	2,072
Total debt		$901,348		$899,134
Less: debt issuance costs		(8,001)		(11,099)
Less: short-term and current portion of long-term debts		(56,935)		(38,967)
Total long-term debt		$836,412		$849,068

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. On December 10, 2021, the Company entered into the Second Amendment with Bank of America N.A., to include among other things, an update to provide for use of a non-USD currency LIBOR successor rate. The variable interest rate incurred on the outstanding borrowings under the Credit Facility as of and during the year ended December 31, 2021 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 $184 million, net of bank letters of credit of approximately $4 million, as of December 31, 2021.

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, 2021, the consolidated net debt to adjusted EBITDA may not exceed 3.75 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, 2021 and December 31, 2020, 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, 2021, the Company made four quarterly amortization payments related to the Term Loans totaling $38.0 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, 2021, 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, 2021 and 2020, the Company had $8.0 million and $11.1 million, respectively, of debt issuance costs recorded as a reduction of long-term debt. As of December 31, 2021 and 2020, the Company had $4.3 million and $5.9 million, respectively, of debt issuance costs recorded within other non-current assets.

Industrial development bonds

As of December 31, 2021 and 2020, 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.

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, 2021, was approximately $26 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, 2021 were approximately $6 million.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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

	Year Ended December 31,		
	2021	2020	2019
Interest expense	$19,089	$23,552	$16,788
Amortization of debt issuance costs	4,749	4,749	1,979
Total	$23,838	$28,301	$18,767

Based on the variable interest rates associated with the Credit Facility, as of December 31, 2021 and 2020, the amounts at which the Company's total debt were recorded are not materially different from their fair market value.

At December 31, 2021, 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:

2022	$ 56,978
2023	75,765
2024	758,241
2025	298
2026	145

(Dollars in thousands, except per share amounts, unless otherwise stated)

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, 2021 and 2020:

	Pension Benefits						Other Post-Retirement Benefits	
	2021			2020			2021	2020
	Foreign	U.S.	Total	Foreign	U.S.	Total	U.S.	U.S.
Change in benefit obligation								
Gross benefit obligation at beginning of year	$247,675	$109,969	$357,644	$217,893	$153,723	$371,616	$3,234	$4,266
Service cost	698	547	1,245	4,340	491	4,831	1	5
Interest cost	2,594	1,737	4,331	3,416	2,923	6,339	27	77
Employee contributions	71	—	71	73	—	73	—	—
Effect of plan amendments	—	—	—	—	50	50	(78)	—
Curtailment gain	—	—	—	(2,324)	—	(2,324)	—	—
Plan settlements	(541)	—	(541)	(2,316)	(53,494)	(55,810)	—	—
Benefits paid	(6,869)	(5,064)	(11,933)	(5,087)	(6,138)	(11,225)	(182)	(250)
Plan expenses and premiums paid	(74)	—	(74)	(135)	—	(135)	—	—
Transfer in of business acquisition	231	—	231	—	—	—	—	—
Actuarial (gain) loss	(4,160)	(3,769)	(7,929)	16,834	12,414	29,248	(992)	(864)
Translation differences and other	(10,873)	—	(10,873)	14,981	—	14,981	—	—
Gross benefit obligation at end of year	$228,752	$103,420	$332,172	$247,675	$109,969	$357,644	$2,010	$3,234

(Dollars in thousands, except per share amounts, unless otherwise stated)

	Pension Benefits						Other Post-Retirement Benefits	
	2021			2020			2021	2020
	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	$228,789	$ 73,481	$302,270	$195,099	$120,550	$315,649	$ —	$ —
Actual return on plan assets	915	7,201	8,116	20,367	10,759	31,126	—	—
Employer contributions	4,289	2,063	6,352	6,912	2,302	9,214	182	250
Employee contributions	71	—	71	73	—	73	—	—
Plan settlements	(541)	—	(541)	(2,316)	(53,494)	(55,810)	—	—
Benefits paid	(6,869)	(5,065)	(11,934)	(5,087)	(6,138)	(11,225)	(182)	(250)
Plan expenses and premiums paid	(74)	—	(74)	(135)	(498)	(633)	—	—
Translation differences	(9,694)	—	(9,694)	13,876	—	13,876	—	—
Fair value of plan assets at end of year	$216,886	$ 77,680	$294,566	$228,789	$ 73,481	$302,270	$ —	$ —
Net benefit obligation recognized	$ (11,866)	$(25,740)	$ (37,606)	$ (18,886)	$ (36,488)	$ (55,374)	$(2,010)	$(3,234)
Amounts recognized in the balance sheet consist of:								
Non-current assets	$ 7,916	$ —	$ 7,916	$ 6,748	$ —	$ 6,748	$ —	$ —
Current liabilities	(191)	(1,137)	(1,328)	(568)	(612)	(1,180)	(220)	(286)
Non-current liabilities	(19,591)	(24,603)	(44,194)	(25,066)	(35,876)	(60,942)	(1,790)	(2,948)
Net benefit obligation recognized	$ (11,866)	$(25,740)	$ (37,606)	$ (18,886)	$ (36,488)	$ (55,374)	$(2,010)	$(3,234)
Amounts not yet reflected in net periodic benefit costs and included in accumulated other comprehensive loss:								
Prior service (cost) credit	(22)	43	21	(26)	50	24	46	—
Accumulated (loss) gain	(19,163)	(9,763)	(28,926)	(21,976)	(5,532)	(27,508)	1,034	124
AOCI	(19,185)	(9,720)	(28,905)	(22,002)	(5,482)	(27,484)	1,080	124
Cumulative employer contributions in excess of or (below) net periodic benefit cost	7,319	(16,020)	(8,701)	3,116	(31,006)	(27,890)	(3,090)	(3,358)
Net benefit obligation recognized	$ (11,866)	$(25,740)	$ (37,606)	$ (18,886)	$ (36,488)	$ (55,374)	$(2,010)	$(3,234)

(Dollars in thousands, except per share amounts, unless otherwise stated)

The accumulated benefit obligation for all defined benefit pension plans was $321.5 million ($103.4 million U.S. and $218.1 million Foreign) and $344.4 million ($109.5 million U.S. and approximately $234.9 million Foreign) as of December 31, 2021 and 2020, respectively.

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

	2021			2020		
	Foreign	U.S.	Total	Foreign	U.S.	Total
Projected benefit obligation	$138,963	$103,420	$242,383	$32,373	$109,969	$142,342
Accumulated benefit obligation	128,268	103,420	231,688	30,892	109,540	140,432
Fair value of plan assets	119,181	77,680	196,861	18,074	73,481	91,555

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

	2021			2020		
	Foreign	U.S.	Total	Foreign	U.S.	Total
Projected benefit obligation	$138,963	$103,420	$242,383	$32,373	$109,969	$142,342
Fair value of plan assets	119,181	77,680	196,861	18,074	73,481	91,555

Components of net periodic benefit costs — pension plans:

	2021			2020		
	Foreign	U.S.	Total	Foreign	U.S.	Total
Service cost	$ 698	$ 547	$ 1,245	$ 4,340	$ 491	$ 4,831
Interest cost	2,594	1,737	4,331	3,416	2,923	6,339
Expected return on plan assets	(4,686)	(3,611)	(8,297)	(4,262)	(4,810)	(9,072)
Settlement loss (gain)	35	—	35	(88)	22,667	22,579
Curtailment charge	—	—	—	(1,155)	—	(1,155)
Actuarial loss amortization	996	2,252	3,248	886	2,110	2,996
Prior service cost (credit) amortization	3	7	10	(167)	—	(167)
Net periodic benefit (income) cost	$ (360)	$ 932	$ 572	$ 2,970	$23,381	$26,351

	2019		
	Foreign	U.S.	Total
Service cost	$ 3,507	$ 434	$ 3,941
Interest cost	3,046	3,313	6,359
Expected return on plan assets	(3,668)	(3,227)	(6,895)
Settlement loss	258	—	258
Actuarial loss amortization	757	2,348	3,105
Prior service credit amortization	(165)	—	(165)
Net periodic benefit cost	$ 3,735	$ 2,868	$ 6,603

(Dollars in thousands, except per share amounts, unless otherwise stated)

Other changes recognized in other comprehensive income — pension plans:

	2021			2020		
	Foreign	U.S.	Total	Foreign	U.S.	Total
Net (gain) loss arising during the period	$ (388)	$ (448)	$ (836)	$(1,594)	$ 1,536	$ (58)
Effect of plan amendment						
Recognition of amortization in net periodic benefit cost						
Settlement loss	(83)	(2,252)	(2,335)	(39)	(22,667)	(22,706)
Prior service (cost) credit	—	(7)	(7)	1,325	50	1,375
Actuarial (loss) gain	(954)	(6,925)	(7,879)	(758)	3,967	3,209
Curtailment Recognition	(3)	—	(3)	(3)	—	(3)
Effect of exchange rates on amounts included in AOCI	(1,390)	—	(1,390)	1,535	—	1,535
Total recognized in other comprehensive (income) loss	(2,818)	(9,632)	(12,450)	466	(17,114)	(16,648)
Total recognized in net periodic benefit cost and other comprehensive (income) loss	$(3,178)	$(8,700)	$(11,878)	$ 3,436	$ 6,267	$ 9,703

	2019		
	Foreign	U.S.	Total
Net loss arising during period	$ 3,826	$ 3,926	$ 7,752
Recognition of amortization in net periodic benefit cost			
Prior service credit	196	—	196
Actuarial loss	(1,015)	(2,347)	(3,362)
Effect of exchange rates on amounts included in AOCI	(61)	—	(61)
Total recognized in other comprehensive loss	2,946	1,579	4,525
Total recognized in net periodic benefit cost and other comprehensive loss	$ 6,681	$ 4,447	$11,128

Components of net periodic benefit costs — other postretirement plan:

	2021	2020	2019
Service cost	$ 1	$ 5	$ 6
Interest cost	27	77	143
Actuarial loss amortization	(82)	(5)	—
Prior service credit amortization	(31)	—	—
Net periodic benefit costs	$ (85)	$ 77	$149

(Dollars in thousands, except per share amounts, unless otherwise stated)

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

	2021	2020	2019
Net (gain) loss arising during period	$ (992)	$(864)	$395
Recognition of amortizations in net periodic benefit cost	(78)	—	—
Prior service credit	31	—	—
Actuarial gain amortization	82	5	—
Total recognized in other comprehensive (income) loss	(957)	(859)	395
Total recognized in net periodic benefit cost and other comprehensive (income) loss	$(1,042)	$(782)	$544

Weighted-average assumptions used to determine benefit obligations as of December 31, 2021 and 2020:

	Pension Benefits		Other Postretirement Benefits	
	2021	2020	2021	2020
U.S. Plans:				
Discount rate	2.58%	2.19%	2.45%	2.05%
Rate of compensation increase	N/A	6.00%	N/A	N/A
Foreign Plans:				
Discount rate	1.71%	1.79%	N/A	N/A
Rate of compensation increase	2.21%	2.74%	N/A	N/A

Weighted-average assumptions used to determine net periodic benefit costs for the years ended December 31, 2021 and 2020:

	Pension Benefits		Other Postretirement Benefits	
	2021	2020	2021	2020
U.S. Plans:				
Discount rate	2.67%	3.11%	1.90%	2.99%
Expected long-term return on plan assets	5.75%	6.50%	N/A	N/A
Rate of compensation increase	6.00%	6.00%	N/A	N/A
Foreign Plans:				
Discount rate	1.38%	2.30%	N/A	N/A
Expected long-term return on plan assets	2.06%	2.20%	N/A	N/A
Rate of compensation increase	2.52%	2.79%	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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Assumed health care cost trend rates as of December 31, 2021 and 2020:

	2021	2020
Health care cost trend rate for next year	5.65%	5.70%
Rate to which the cost trend rate is assumed to decline (the ultimate trend rate)	4.00%	4.50%
Year that the rate reaches the ultimate trend rate	2046	2037

Plan Assets and Fair Value

The Company's pension plan target asset allocation and the weighted-average asset allocations as of December 31, 2021 and 2020 by asset category were as follows:

Asset Category	Target	2021	2020
U.S. Plans			
Equity securities	44%	46%	58%
Debt securities	50%	48%	36%
Other	6%	6%	6%
Total	100%	100%	100%
Foreign Plans			
Equity securities	39%	36%	33%
Debt securities	50%	43%	45%
Other	11%	21%	22%
Total	100%	100%	100%

As of December 31, 2021 and 2020, "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, 2021, 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, 2021, the U.S. pension plan pooled separate accounts included approximately 49 percent of investments in equity securities and 51 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, 2021, the diversified investment funds included approximately 62 percent of investments in equity securities, 20 percent of investments in fixed income securities, and 18 percent of other alternative investments.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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, 2021 and 2020, the U.S. and foreign plans' investments measured at fair value on a recurring basis were as follows:

	Total Fair Value	Fair Value Measurements at December 31, 2021 Using Fair Value Hierarchy		
		Level 1	Level 2	Level 3
U.S. Pension Assets				
Pooled separate accounts	$ 72,721	$ —	$ 72,721	$ —
Real estate	4,959	—	—	4,959
Subtotal U.S. pension plan assets in fair value hierarchy	$ 77,680	$ —	$ 72,721	$ 4,959
Total U.S. pension plan assets	$ 77,680			
Foreign Pension Assets				
Cash and cash equivalents	$ 1,989	$1,989	$ —	$ —
Insurance contract	99,527	—	—	99,527
Diversified equity securities — registered investment companies	10,999	—	10,999	—
Fixed income — foreign registered investment companies	3,593	—	3,593	—
Fixed income government securities	35,339	—	35,339	—
Real estate	6,588	—	—	6,588
Other — alternative investments	6,979	—	—	6,979
Sub-total of foreign pension assets in fair value hierarchy	$165,014	$1,989	$ 49,931	$113,094
Commingled funds measured at NAV	2,300			
Diversified investment fund — registered investment companies measured at NAV	49,572			
Total foreign pension assets	$216,886			
Total pension assets in fair value hierarchy	$242,694	$1,989	$122,652	$118,053
Total pension assets measured at NAV	51,872			
Total pension assets	$294,566			

(Dollars in thousands, except per share amounts, unless otherwise stated)

U.S. Pension Assets	Total Fair Value	Fair Value Measurements at December 31, 2020 Using Fair Value Hierarchy		
		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			

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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Changes in the fair value of the plans' Level 3 investments during the years ended December 31, 2021 and 2020 were as follows:

	Insurance Contract	Real Estate	Alternative Investments	Total
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
Purchases	1,722	(78)	(334)	1,310
Settlements	(1,812)	—	—	(1,812)
Unrealized (losses) gains	(5,031)	1,926	(3,282)	(6,387)
Currency translation adjustment	(8,272)	(76)	(43)	(8,391)
Balance as of December 31, 2021	$ 99,527	$11,547	$ 6,979	$118,053

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 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, 2020, the last valuation date available for the multiemployer plan, total plan liabilities were approximately $587 million. As of December 31, 2020, the multiemployer pension plan had total plan assets of approximately $387 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 $0.2 million during the year ended December 31, 2021. 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, 2021.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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$10.6 million to its pension plans (approximately $6.6 million U.S. and $4.0 million Foreign) and approximately $0.2 million to its other postretirement benefit plan in 2022.

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 Benefits
	Foreign	U.S.	Total	
2022	$ 6,678	$ 6,627	$13,305	$220
2023	6,661	6,043	12,704	209
2024	6,475	6,205	12,680	187
2025	6,984	6,199	13,183	174
2026	7,702	6,213	13,915	157
2027 to 2031	42,577	30,169	72,746	625

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 $3.0 million, $2.5 million and $1.8 million for the years ended December 31, 2021, 2020 and 2019, 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 and continuing through March 2021, the Company matched 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 $4.8 million, $5.7 million and $4.0 million for the years ended December 31, 2021, 2020 and 2019, respectively.

(Dollars in thousands, except per share amounts, unless otherwise stated)

Note 22 — Other Non-Current Liabilities

Other non-current liabilities as of December 31, 2021 and 2020 were as follows:

	2021	2020
Uncertain tax positions (includes interest and penalties)	$28,665	$28,961
Non-current income taxes payable	8,500	8,500
Deferred and other long-term compensation	6,388	6,257
Environmental reserves	4,424	4,610
Inactive subsidiary litigation and settlement reserve	410	542
Fair value of interest rate swaps	—	4,672
Other	1,228	1,627
Total other non-current liabilities	$49,615	$55,169

The Fair value of interest rate swaps as of December 31, 2021 has been reclassified to other accrued liabilities in connection with the expiration of the swap contract in November 2022. See Notes 19 and 25 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 17,897,033 and 17,850,616 shares issued and outstanding as of December 31, 2021 and 2020, respectively. The change in shares issued and outstanding during 2021 was primarily related to 29,415 shares issued for share-based compensation plans and 17,002 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. The Board 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, 2021, no preferred stock had been issued.

The Company has a share repurchase program that was approved by its Board 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, 2021, 2020 and 2019. As of December 31, 2021, there was approximately $86.9 million of common stock remaining to be purchased under this share repurchase program.

(Dollars in thousands, except per share amounts, unless otherwise stated)

The following table shows the reclassifications from and resulting balances of AOCI for the years ended December 31, 2021, 2020 and 2019:

	Currency Translation Adjustments	Defined Benefit Pension Plans	Unrealized Gain (Loss) in Available-for-Sale Securities	Derivative Instruments	Total
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)
Other comprehensive (loss) income before reclassifications	(46,968)	11,948	(531)	2,890	(32,661)
Amounts reclassified from AOCI	—	1,459	(3,197)	—	(1,738)
Related tax amounts	—	(3,112)	783	(664)	(2,993)
Balance as of December 31, 2021	$(49,843)	$(13,172)	$ 397	$(1,372)	$(63,990)

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.

(Dollars in thousands, except per share amounts, unless otherwise stated)

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:

	Total Fair Value	Fair Value Measurements at December 31, 2021 Using Fair Value Hierarchy		
		Level 1	Level 2	Level 3
Assets				
Company-owned life insurance	$2,533	$—	$2,533	$—
Total	$2,533	$—	$2,533	$—

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

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, 2021 or 2020, 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 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, 2021	Fair Value December 31, 2020
Derivatives designated as cash flow hedges:			
Interest rate swaps	Other accrued liabilities	$1,782	$ —
	Other non-current liabilities	—	4,672
		$1,782	$4,672

(Dollars in thousands, except per share amounts, unless otherwise stated)

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

		December 31,	
		2021	2020
Derivatives designated as cash flow hedges:			
Interest rate swaps	AOCI	$1,372	$3,598
		$1,372	$3,598

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

		For the Years Ended December 31,		
		2021	2020	2019
Amount and location of (expense) income reclassified from AOCI into (expense) income (Effective Portion)	Interest expense, net	$(2,649)	$(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 performed such testing program work in 2021 and will continue into 2022. As of December 31, 2021, 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, 2021, 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 $0.4 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 originally 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.

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, 2021, 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 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.

The Company is party to environmental matters related to certain domestic and foreign properties. These environmental matters primarily require the Company to perform long-term monitoring as well as operating and maintenance at each of the applicable sites. During the year ended December 31, 2021, there have been no significant changes to the facts or circumstances of these matters, aside from ongoing monitoring and maintenance activities and routine payments associated with each of these 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 27 years, has estimated the present value range of costs for all of these environmental matters, on a discounted basis, to be between approximately $5.0 million and $6.0 million as of December 31, 2021, for which $5.6 million is accrued within other accrued liabilities and other non-current liabilities on the Company's Consolidated Balance Sheet as of December 31, 2021. Comparatively, as of December 31, 2020, the Company had $6.0 million accrued for with respect to these matters.

The Company'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 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 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. The Company 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 $0.4 million and $0.1 million were accrued as of December 31, 2021 and 2020, 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. During the third quarter of 2021, the Company's subsidiary received notice from the taxing authority that the inspection was closed, with no tax assessment issued. Based on this development, during the third quarter of 2021, the Company reversed its previously recorded $1.8 million liability related to this matter. The Company also reversed the associated $1.1 million indemnification receivable, as the asserted tax liability in part related to a Houghton entity acquired in the Combination and for the periods prior to the Combination, for which the Company would have rights to indemnification from Houghton's former owners. Based on all available information as of the date of this report, the Company does not anticipate further tax liabilities related to this matter to be asserted by the taxing authority.

During 2021, one of the Company's Brazilian subsidiaries received a notice that it had prevailed on an existing legal claim in regard to certain non-income (indirect) taxes that had been previously charged and paid. The matter specifically relates to companies' rights to exclude the state tax on goods circulation (a valued-added-tax or VAT equivalent, known in Brazil as "ICMS") from the calculation of certain additional indirect taxes (specifically the program of social integration ("PIS") and contribution for the financing of social security ("COFINS")) levied by the Brazilian States on the sale of goods. In May 2021, the Brazilian Supreme Court concluded that ICMS should not be included in the tax base of PIS and COFINS, and confirmed the methodology for calculating the PIS and COFINS tax credit claims to which taxpayers are entitled. The Company's Brazilian entities had previously filed legal or administrative disputes on this matter and are entitled to receive tax credits and interest dating back to five years preceding the date of their legal claims. As a result of these court rulings, during the second quarter of 2021, the Company recognized non-income tax credits of 67.0 million BRL or approximately $13.3 million, which included approximately $8.4 million for the PIS and COFINS tax credits as well as interest on these tax credits of $4.9 million, and is recorded within prepaid and other current assets on the Company's Consolidated Balance Sheet. The tax credits to which the Company's Brazilian subsidiaries are entitled are claimable once registered with the Brazilian tax authorities. The Company submitted its formal claim for tax credits in October 2021. These tax credits can be used to offset future Brazilian federal taxes and the Company currently anticipates using the full amount of credits during the five year period of time permitted. During the third quarter of 2021, the Brazilian Supreme Court ruled that interest income to which companies are entitled for matters such as this claim should not be taxable, which resulted in a reduction to the estimated income tax expense associated with the tax credits recorded.

In connection with obtaining regulatory approvals for the Combination, certain steel and aluminum related product lines of Houghton were divested in August 2019. In July 2021, the entity that acquired these divested product lines submitted an indemnification claim for certain alleged breaches of representation made by Houghton in the agreement pursuant to which such assets had been divested. The Company and the acquirer have agreed to extend the period for a possible negotiated resolution of this claim through March 31, 2022 so that both parties can evaluate the other's positions with respect to the subject matters of the claim. The Company is evaluating the merits of the alleged losses in the indemnification claim received. As of the date of this Report, the Company does not believe it is reasonably possible to determine or quantify any possible exposure.

During the third quarter of 2021, two of the Company's locations suffered property damages as a result of flooding and fire, respectively. The Company maintains property insurance for all of its facilities globally. In Conshohocken, Pennsylvania, the Company's global headquarters as well as its laboratory experienced property damages as a result of flooding from Hurricane Ida. Also, one of the Company's North American production facilities in its Global Specialty Businesses segment experienced an electrical fire that resulted in damage and the temporary shutdown of production, and also required remediation, cleaning and subsequent restoration. The Company, its insurance adjuster and insurance carrier are actively managing the remediation and restoration activities associated with these events and at this time the Company has concluded, based on all available information and discussions with its insurance adjuster and insurance carrier, that the losses incurred during the third quarter of 2021 will be covered under the Company's property insurance coverage, net of an aggregate deductible of $2.0 million. The Company has received payments from its insurers of $2.1 million and has recorded an insurance receivable associated with these events (and a gain on insurance recoveries for losses incurred) of $0.7 million as of December 31, 2021. The Company and its insurance carrier are in early stages of reviewing the impact of the electrical fire on the production facility's operations as it relates to a potential business interruption insurance claim; however, as of the date of this Report, the Company cannot reasonably estimate any probable amount of business interruption insurance claim recoverable, therefore the Company has not recorded a gain contingency for a possible business interruption insurance claim as of December 31, 2021.

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.

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 December 31, 2021, 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 effective.

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, 2021. 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"). Based on its assessment, management has concluded that as of December 31, 2021, the Company's internal control over financial reporting is effective based on those criteria.

Management has excluded the internal controls of Grindaix GmbH and Baron Industries from our assessment of internal control over financial reporting as of December 31, 2021, because these entities were acquired by the Company in purchase business combinations in September and November 2021, respectively. Grindaix GmbH and Baron Industries are wholly owned subsidiaries whose total assets and total revenues excluded from our assessment of internal control over financial reporting each represent less than 1% of the related consolidated financial statement amounts as of and for the year ended December 31, 2021.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2021 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."

Remediation of the Previously Identified Material Weaknesses

As disclosed in "Item 9A. Controls and Procedures." in the Company's 2020 Form 10-K, we previously identified certain deficiencies in our application of the principles associated with the COSO framework that management concluded constituted material weaknesses. 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.

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. During 2020 and 2021, 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.

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 2020 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 and in 2021, a full review was performed of our processes and controls across significant and other 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. As previously disclosed in the 2020 Form 10-K, this material weakness remediation was also dependent on the remediation of the Revenue – Price and Quantity material weakness. During the fourth quarter of 2021, we completed testing of the operating effectiveness of the controls (including Revenue- Price and Quantity) and have concluded that the material weakness has been remediated as of December 31, 2021.

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 2020 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 redesigned certain aspects of its revenue process and related controls. The design included enhancements to entity-level and transactional-level manual controls as well as IT general and application controls, which were substantially implemented during the third quarter of 2021. During the fourth quarter of 2021, we completed testing of the operating effectiveness of the controls and have concluded that the material weakness has been remediated as of December 31, 2021.

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, 2021, 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, 2021.

Item 9B. *Other Information.*

Not applicable.

Item 9C. *Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.*

Not applicable.

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 2022 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, 2021 (the "2022 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 2022 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 (iv) the information in the 2022 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 2022 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 2022 Proxy Statement beginning with and including the caption "Stock Ownership of Certain Beneficial Owners and Management" to, but not including, the caption "Certain Relationships and Related Transactions."

Equity Compensation Plans

The following table sets forth certain information relating to the Company's equity compensation plans as of December 31, 2021. 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	109,684	$165.47	606,155(1)
Equity compensation plans not approved by security holders	—	—	—
Total	109,684	$165.47	606,155(1)

(1) As of December 31, 2021, 304,900 of these shares were available for issuance as restricted stock awards under the Company's 2001 Global Annual Incentive Plan, 240,004 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 61,251 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 2022 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 2022 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 2022 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 2022 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, 2022.

PART IV

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

(a) Exhibits and Financial Statement Schedules

1. Financial Statements and Supplementary Data

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.

10.1 — 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.

10.2 — 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.

10.3 — 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. †

10.4 — 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. †

10.5 — 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. †

10.6 — 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. †

10.7 — 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. †

10.8 — 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. †

10.9 — Employment Agreement by and between Registrant and Joseph Berquist dated August 18 2021, effective on September 9, 2021. Incorporated by reference to Exhibit 10.3 as filed by the registrant with Form 10-Q for the quarter ended September 30, 2021. †

10.10 — 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. †

10.11 — 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. †

10.12 — Employment Agreement by and between Registrant and Andrew Tometich dated September 2, 2021, effective on October 11, 2021. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 10-Q for the quarter ended September 30, 2021.. †

10.13 — Change in Control Agreement by and between Registrant and Andrew Tometich dated September 2, 2021, effective on October 11, 2021. Incorporated by reference to Exhibit 10.2 as filed by the Registrant with Form 10-Q for the quarter ended on September 30, 2021. †

10.14 — 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.†

10.15 — 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.†

10.16 — 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.†

10.17 — 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.†

10.18 — 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.†

10.19 — Memorandum of Employment by and between the Registrant and Shane Hostetter dated and effective April 19, 2021. Incorporated by reference to Exhibit 10.1 as filed by the Registrant with Form 10-Q for the quarter ended on March 31, 2021. †

10.20 — Form of Change of Control Agreement by and between the Registrant and Shane Hostetter dated and effective April 19, 2021. Incorporated by reference to Exhibit 10.2 as filed by the Registrant with Form 10-Q for the quarter that ended on March 31, 2021. †

10.21 — Memorandum of Employment by and between the Registrant and David Will dated March 22, 2021 and effective April 19, 2021. Incorporated by reference to Exhibit 10.3 as filed by the Registrant with Form 10-Q for the quarter ended on March 31, 2021. †

10.22 — 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.†

10.23 — 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. †

10.24 — 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. †

10.25 — 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. †

10.26 — Retirement Savings Plan, as amended and restated effective January 22, 2021, approved November 1, 2021. *†

10.27 — Quaker Houghton Annual Incentive Plan (as amended and restated effective November 17, 2021). *†

10.28 — 2011 Long-Term Performance Incentive Plan. Incorporated by reference to Appendix C to the Registrant's definitive proxy statement filed on March 31, 2011. †

10.29 — 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. †

10.30 — 2016 Long-Term Performance Incentive Plan. Incorporated by reference to Appendix C to the Registrant's definitive proxy statement filed on March 28, 2016. †

10.31 — 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. †

10.32 — 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. †

10.33 — 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. †

10.34 — Chief Executive Officer Transition Agreement dated April 22, 2021, effective December 31, 2021. Incorporated by reference to Exhibit 10.4 as filed by the Registrant with Form 10-Q for the quarter ended on March 31, 2021. †

10.35 — Form of Restricted Stock Award Agreement for non-employee directors under Registrant's 2016 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 on June 30, 2021. †

10.36 — 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 10.2 as filed by the Registrant with Form 10-Q for the quarter ended on June 30, 2021. †

10.37 — Form of Incentive Stock Option 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 the Registrant with Form 10-Q for the quarter ended on June 30, 2021. †

10.38 — Form of Non-Qualified Stock Option Award 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 the Registrant with Form 10-Q for the quarter ended on June 30, 2021. †

10.39 — Form of Restricted Stock Unit Award Agreement for executive officers and other employees under Registrant's 2016 Long-Term Performance Incentive Plan. Incorporated by reference to Exhibit 10.5 as filed by the Registrant with Form 10-Q for the quarter ended on June 30, 2021. †

10.40 — Form of Performance Stock Unit Award Agreement for executive officers and other employees under Registrant's 2016 Long-Term Performance Incentive Plan. Incorporated by reference to Exhibit 10.6 as filed by the Registrant with Form 10-Q for the quarter ended on June 30, 2021. †

10.41 — 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.

10.42 — 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.

10.43 — 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.

10.44 — 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.***

10.45 — 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.

10.46 — Amendment No. 2, dated as of December 10, 2021, to the Credit Agreement, dated as of August 1, 2019.*

10.47 — 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.

10.48 —	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.***
10.49 —	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.***
10.50 —	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. †
10.51 —	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. †
10.52 —	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 Andrew E. Tometich pursuant to 18 U.S.C. Section 1350.**
32.2 —	Certification of Shane W. Hostetter 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/ ANDREW E. TOMETICH

Andrew E. Tometich
Director, Chief Executive Officer and President

Date: March 1, 2022

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/ ANDREW E. TOMETICH **Andrew E. Tometich** **Chief Executive Officer and President**	Principal Executive Officer and Director	March 1, 2022
/s/ SHANE W. HOSTETTER **Shane W. Hostetter** **Senior Vice President, Chief Financial Officer and Chief Accounting Officer**	Principal Financial Officer	March 1, 2022
/s/ DAVID A. WILL **David A. Will** **Vice President, Global Controller**	Principal Accounting Officer	March 1, 2022
/s/ MICHAEL F. BARRY **Michael F. Barry** **Chairman of the Board**	Director	March 1, 2022
/s/ DONALD R. CALDWELL **Donald R. Caldwell**	Director	March 1, 2022
/s/ CHARLOTTE C. DECKER **Charlotte C. Decker**	Director	March 1, 2022
/s/ MARK A. DOUGLAS **Mark A. Douglas**	Director	March 1, 2022
/s/ JEFFRY D. FRISBY **Jeffry D. Frisby**	Director	March 1, 2022
/s/ WILLIAM H. OSBORNE **William H. Osborne**	Director	March 1, 2022

Signatures	Capacity	Date
/s/ ROBERT H. ROCK **Robert H. Rock**	Director	March 1, 2022
/s/ FAY WEST **Fay West**	Director	March 1, 2022
/s/ SANJAY HINDUJA **Sanjay Hinduja**	Director	March 1, 2022
/s/ RAMASWAMI SESHASAYEE **Ramaswami Seshasayee**	Director	March 1, 2022
/s/ MICHAEL SHANNON **Michael Shannon**	Director	March 1, 2022

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. Ltd.	Australia	100%
+*	Quaker Houghton Australia Pty. Ltd. (formerly Houghton Australia Party Ltd)	Australia	100%
*	Surface Technology Australia	Australia	100%
**	Primex, Ltd.	Barbados	32%
+*	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 Houghton Chemical Investment Management (Shanghai) Co., Ltd. (Formerly Quaker Chemical Investment Management (Shanghai) Co Ltd)	China	100%
*	Quaker Houghton Material Science & Technology (Suzhou) Co Ltd	China	100%
*	Wuhan Quaker Technology Co., Ltd	China	60%
*	Houghton (Shanghai) Specialty Industrial Fluids Co., Ltd	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%
*	SIFCO Concepts Sarl	France	100%
*	Quaker Houghton Support France EURL (Formerly Quaker Chemical Services EURL)	France	100%
*	ECL Engineered Custom Lubricants GmbH	Germany	100%
*	Houghton Deutschland GmbH	Germany	100%
*	Grindaix GmbH	Germany	100%
*	Quaker Houghton Support Deutschland	Germany	100%

SUBSIDIARIES AND AFFILIATES OF THE REGISTRANT, *continued*

Name		Jurisdiction of Incorporation	Percentage of Voting Securities Owned Directly or Indirectly by Quaker
*	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%
*	Houghton Hardcastle India Ltd	India	9%
*	DA Stuart India Private Limited	India	100%
*	Ultraseal India Private Ltd	India	30%
*	Quaker Italia S.r.l.	Italy	100%
*	Quaker Houghton Support Italia S.r.l. (formerly: 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%
*	Ultraseal Japan	Japan	100%
*	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 Houghton 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%
*	Lubricor Mexicana S.A. de C.V.	Mexico	100%
+*	Quaker Chemical Europe B.V.	Netherlands	100%
*	Quaker Houghton B.V. (formerly Quaker Chemical BV)	Netherlands	100%
+*	Quaker Houghton Russia B.V. (formerly Quaker Chemical Russia B.V.; KWR Holdings B.V.)	Netherlands	100%
+*	Quaker China Holdings B.V.	Netherlands	100%
+*	Houghton Europe BV	Netherlands	100%
+*	QH Europe BV	Netherlands	100%
*	Quaker Houghton Sales BV (formerly 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%
*	Quaker Houghton Singapore (formerly Houghton Singapore)	Singapore	100%
**	Korea Houghton Corporation	South Korea	50%
*	Quaker Chemical, S.A.	Spain	100%
*	Verkol S.A.U.	Spain	100%

SUBSIDIARIES AND AFFILIATES OF THE REGISTRANT, *continued*

Name		Jurisdiction of Incorporation	Percentage of Voting Securities Owned Directly or Indirectly by Quaker
+*	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%
*	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%
*	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%
+*	SB Decking, Inc. (formerly Selby, Battersby & Co.)	United States	100%
*	AC Products, Inc.	United States	100%
*	Epmar Corporation	United States	100%
*	Summit Lubricants, Inc.	United States	100%
*	ECLI Products, LLC	United States	100%
+*	GH Holdings Inc.	United States	100%
+*	Houghton Technical Corp.	United States	100%
*	SIFCO Applied Surface Concepts, LLC	United States	100%
*	Quaker Houghton PA, Inc. (formerly Houghton International, Inc.)	United States	100%
*	Ultraseal USA Inc.	United States	100%

SUBSIDIARIES AND AFFILIATES OF THE REGISTRANT, *continued*

Name		Jurisdiction of Incorporation	Percentage of Voting Securities Owned Directly or Indirectly by Quaker
+*	Wallover Enterprises, Inc.	United States	100%
*	Wallover Oil Company Incorporated	United States	100%
*	Wallover Oil Hamilton Inc.	United States	100%
+*	Quaker International Holdings, LLC	United States	100%
+*	MIH Acquisition Company, LLC	United States	100%
*	Coral Chemical Company, LLC	United States	100%
*	Baron Acquisition LLC (d/b/a Baron Industries LLC)	United States	100%
*	Baron of Tennessee LLC	United States	100%
*	Quaker Chemical Corporation (PA)	United States	100%
*	Quaker Chemical Corporation (DE)	United States	100%
+*	EFHCO, LLC	United States	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, 2022 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, 2022

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, Andrew E. Tometich, 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, 2022

/s/ ANDREW E. TOMETICH

Andrew E. Tometich

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, Shane W. Hostetter, 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, 2022

/s/ Shane W. Hostetter

Shane W. Hostetter

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, 2021 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, 2022

/s/ ANDREW E. TOMETICH

Andrew E. Tometich

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, 2021 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, 2022

/s/ SHANE W. HOSTETTER

Shane W. Hostetter

Chief Financial Officer of Quaker Chemical Corporation

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Quaker Houghton™

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