UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549
Form 10-K

(Mark One)

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

For the fiscal year ended December 31, 2020

OR

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

For the transition period from ______ to______
Commission file number 1-1070

OLIN CORPORATION
(Exact name of registrant as specified in its charter)

Virginia	**13-1872319**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
190 Carondelet Plaza, Suite 1530, Clayton, MO	**63105**
(Address of principal executive offices)	(Zip code)

Registrant's telephone number, including area code: (314) 480-1400

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

Title of each class:	Trading symbol:	Name of each exchange on which registered:
Common Stock, $1.00 par value per share	OLN	New York Stock Exchange

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes X 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 X

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 X 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 X 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 X 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. X

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

As of June 30, 2020, the aggregate market value of registrant's common stock, $1.00 par value per share, held by non-affiliates of registrant was approximately $1,805,210,520 based on the closing sale price as reported on the New York Stock Exchange.

As of January 31, 2021, 158,368,176 shares of the registrant's common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE
Portions of the following document are incorporated by reference in this Form 10-K as indicated herein:

Document	Part of 10-K into which incorporated
Proxy Statement relating to Olin's Annual Meeting of Shareholders to be held in 2021	Part III

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PART I

Item 1. BUSINESS

GENERAL

Olin Corporation (Olin) is a Virginia corporation, incorporated in 1892, having its principal executive offices in Clayton, MO. We are a manufacturer concentrated in three business segments: Chlor Alkali Products and Vinyls, Epoxy and Winchester. The Chlor Alkali Products and Vinyls segment manufactures and sells chlorine and caustic soda, ethylene dichloride and vinyl chloride monomer, methyl chloride, methylene chloride, chloroform, carbon tetrachloride, perchloroethylene, trichloroethylene, hydrochloric acid, hydrogen, bleach products and potassium hydroxide, which represent 51% of 2020 sales. The Epoxy segment produces and sells a full range of epoxy materials and precursors, including aromatics (acetone, bisphenol, cumene and phenol), allyl chloride, epichlorohydrin, liquid epoxy resins, solid epoxy resins and downstream products such as converted epoxy resins and additives, which represent 33% of 2020 sales. The Winchester segment produces and sells sporting ammunition, reloading components, small caliber military ammunition and components, and industrial cartridges, which represent 16% of 2020 sales. See our discussion of our segment disclosures contained in Item 7—"Management's Discussion and Analysis of Financial Condition and Results of Operations."

GOVERNANCE

We maintain an Internet website at www.olin.com. Our reports on Form 10-K, Form 10-Q and Form 8-K, as well as amendments to those reports, are available free of charge on our website, as soon as reasonably practicable after we file the reports with the Securities and Exchange Commission (SEC). Also, a copy of our electronically filed materials can be obtained at www.sec.gov. Our Principles of Corporate Governance, Committee Charters and Code of Conduct are available on our website at www.olin.com in the Leadership & Governance Section under Governance Documents and Committees.

In May 2020, our Chief Executive Officer (CEO) executed the annual Section 303A.12(a) CEO Certification required by the New York Stock Exchange (NYSE), certifying that he was not aware of any violation of the NYSE's corporate governance listing standards by us. Additionally, our Chief Executive Officer and Chief Financial Officer (CFO) executed the required Sarbanes-Oxley Act of 2002 Sections 302 and 906 certifications relating to this Annual Report on Form 10-K, which are filed with the SEC as exhibits to this Annual Report on Form 10-K.

PRODUCTS, SERVICES AND STRATEGIES

Chlor Alkali Products and Vinyls

Products and Services

We have been involved in the chlor alkali industry for nearly 130 years and consider ourselves as the leading global chlor alkali and derivatives producer. Chlorine, caustic soda and hydrogen are co-produced commercially by the electrolysis of salt. These co-produced products are produced simultaneously, and in a fixed ratio of 1.0 ton of chlorine to 1.1 tons of caustic soda and 0.03 tons of hydrogen. The industry refers to this as an Electrochemical Unit or ECU.

Chlorine is used as a raw material in the production of thousands of products, including vinyls, urethanes, epoxy, water treatment chemicals and a variety of other organic and inorganic chemicals. A significant portion of chlorine production is consumed in the manufacture of ethylene dichloride (EDC) and vinyl chloride monomer (VCM), both of which our Chlor Alkali Products and Vinyls segment produces. A large portion of our EDC production is utilized in the production of VCM, but we are also one of the largest global participants in merchant EDC sales. EDC and VCM are precursors for polyvinyl chloride (PVC). PVC is a plastic used in applications such as vinyl siding, pipe, pipe fittings and automotive parts.

Our Chlor Alkali Products and Vinyls segment is one of the largest global marketers of caustic soda, including caustic soda produced by a third party in Brazil. The diversity of caustic soda sourcing allows us to cost effectively supply customers worldwide. Caustic soda has a wide variety of end-use applications, the largest of which includes water treatment, alumina, pulp and paper, urethanes, detergents and soaps and a variety of other organic and inorganic chemicals.

Our Chlor Alkali Products and Vinyls segment also includes our chlorinated organics business which is the largest global producer of chlorinated organic products that include chloromethanes (methyl chloride, methylene chloride and chloroform) and chloroethanes (perchloroethylene, trichloroethylene and carbon tetrachloride). Our chlorinated organics business participates in both the solvent segment, as well as the intermediate segment of the global chlorocarbon industry with a focus on sustainable applications and in applications where we can benefit from our cost advantages. Intermediate products are used as feedstocks in the production of fluoropolymers, fluorocarbon refrigerants and blowing agents, silicones, cellulosics and agricultural chemicals. Solvent products are sold into end uses such as surface preparation, dry cleaning, pharmaceuticals and regeneration of refining catalysts. This business's unique technology allows us to utilize both hydrochloric acid and chlorinated hydrocarbon byproducts (RCls), produced by our other production processes, as raw materials in an integrated system.

We also manufacture and sell other chlor alkali-related products, including hydrochloric acid, sodium hypochlorite (bleach) and potassium hydroxide, which we refer to as co-products. The production of co-products, chlorinated organics products and epoxy resins generally consume chlorine as a raw material creating downstream applications that upgrade the value of chlorine and enable caustic soda production. Our industry leadership in the production of chlorinated organics and epoxy resins, as well as other co-products, offer us eighteen integrated outlets for our captive chlorine.

The Chlor Alkali Products and Vinyls segment's products are delivered by pipeline, marine vessel, deep-water and coastal barge, railcar and truck. Our logistics and terminal infrastructure provides us with geographically advantaged storage capacity and provides us with a private fleet of trucks, tankers and trailers that expands our geographic coverage and enhances our service capabilities. At our largest integrated product sites, our deep-water access enables us to reach global markets.

Our Chlor Alkali Products and Vinyls segment maintains strong relationships with The Dow Chemical Company (Dow) as both a customer and supplier. These relationships are maintained through long-term cost based contracts that provide us with a reliable supply of key raw materials and predictable and consistent demand for our end use products. Key products sold to Dow include chlorine, caustic soda, chlorinated organics and VCM. In 2021, our VCM contract transitions from a toll manufacturing arrangement to a direct customer sale agreement. Key raw materials received from Dow include ethylene and electricity. Ethylene is supplied for the vinyls business under a long-term supply arrangement with Dow whereby we receive ethylene at integrated producer economics.

Electricity, salt, ethylene and methanol are the major purchased raw materials for our Chlor Alkali Products and Vinyls segment. Electricity is the single largest raw material component in the production of Chlor Alkali Products and Vinyls' products. Approximately 72% of our electricity is generated from natural gas or hydroelectric sources. Approximately 59% of our salt requirements are met by internal supply. Methanol is sourced domestically and internationally primarily from large producers. The high volume nature of the chlor alkali industry places an emphasis on cost management and we believe that our scale, integration and raw material positions make us one of the low cost producers in the industry.

The following table lists principal products and services of our Chlor Alkali Products and Vinyls segment.

Products & Services	***Major End Uses***	***Plants & Facilities***	***Major Raw Materials & Components for Products/Services***
Chlorine/caustic soda	Pulp & paper processing, chemical manufacturing, water purification, vinyl chloride manufacturing, bleach, swimming pool chemicals and urethane chemicals	Becancour, Canada Charleston, TN Freeport, TX McIntosh, AL Niagara Falls, NY Plaquemine, LA St. Gabriel, LA	salt, electricity
Ethylene dichloride/vinyl chloride monomer	Precursor to polyvinyl chloride used in vinyl siding, plumbing and automotive parts	Freeport, TX Plaquemine, LA	chlorine, ethylene, ethylene dichloride
Chlorinated organics intermediates	Used as feedstocks in the production of fluoropolymers, fluorocarbon refrigerants and blowing agents, silicones, cellulosics and agricultural chemicals	Freeport, TX Plaquemine, LA Stade, Germany	chlorine, ethylene dichloride, hydrochloric acid, methanol, RCls
Chlorinated organics solvents	Surface preparation, dry cleaning and pharmaceuticals	Freeport, TX Plaquemine, LA Stade, Germany	chlorine, ethylene dichloride, hydrochloric acid, RCls
Sodium hypochlorite (bleach)	Household cleaners, laundry bleaching, swimming pool sanitizers, semiconductors, water treatment, textiles, pulp & paper and food processing	Augusta, GA Becancour, Canada Charleston, TN Freeport, TX Henderson, NV Lemont, IL McIntosh, AL* Niagara Falls, NY* Santa Fe Springs, CA Tracy, CA	caustic soda, chlorine
Hydrochloric acid	Steel, oil & gas, plastics, organic chemical synthesis, water & wastewater treatment, brine treatment, artificial sweeteners, pharmaceuticals, food processing and ore & mineral processing	Becancour, Canada Charleston, TN Freeport, TX McIntosh, AL Niagara Falls, NY	chlorine, hydrogen
Potassium hydroxide	Fertilizer manufacturing, soaps, detergents & cleaners, battery manufacturing, food processing chemicals and deicers	Charleston, TN	electricity, potassium chloride
Hydrogen	Fuel source, hydrogen peroxide and hydrochloric acid	Becancour, Canada Charleston, TN Freeport, TX McIntosh, AL Niagara Falls, NY Plaquemine, LA St. Gabriel, LA	electricity, salt

* Includes low salt, high strength bleach manufacturing.

Strategies

Maximize returns to the ECU. Leverage our diverse and flexible chlor alkali derivatives portfolio via our differentiated operating model to continually mitigate exposure to the prevailing weaker side of the ECU and maximize value from the stronger side of the ECU.

Participate in global trade flow of the products we market. Access excess product available for global trade, complementing our internal produced product to serve a growing customer demand at the highest value.

Continually drive down costs through productivity. Our advantaged cost position is derived from low cost energy, scale, integration, and deep water ports. Maintaining a strong discipline on areas such as cost management, capital outlays, and asset maintenance are key to creating greater operating flexibility to maximize returns to the ECU.

Epoxy

Products and Services

The Epoxy business was one of the first major manufacturers of epoxy products, and has continued to build on more than half a century of history through product innovation and technical excellence. We believe the Epoxy segment is one of the largest fully integrated global producers of epoxy resins, curing agents and intermediates. The Epoxy segment has a favorable manufacturing cost position which is driven by a combination of scale and integration into low cost feedstocks (including chlorine, caustic soda, allylics and aromatics). With its advantaged cost position, the Epoxy segment is among the lowest cost producers in the world. The Epoxy segment produces and sells a full range of epoxy materials and precursors, including upstream products such as aromatics (acetone, bisphenol (BisA), cumene and phenol), allyl chloride (Allyl) and epichlorohydrin (EPI), midstream products such as liquid epoxy resins (LER) and solid epoxy resins (SER) and downstream products such as converted epoxy resins (CER) and additives.

The Epoxy segment serves a diverse array of applications, including wind energy, electrical laminates, consumer goods and composites, as well as numerous applications in civil engineering and protective coatings. The Epoxy segment has important relationships with established customers, some of which span decades. The Epoxy segment's primary geographies are North America and Western Europe. The segment's product is delivered primarily by marine vessel, deep-water and coastal barge, railcar and truck.

Allyl is used not only as a feedstock in the production of EPI, but also as a chemical intermediate in multiple industries and applications, including water purification chemicals. EPI is primarily produced as a feedstock for use in the business's epoxy resins, and also sold to epoxy producers globally who produce their own resins for end use segments such as coatings and adhesives. LER is manufactured in liquid form and cures with the addition of a hardener into a three-dimensional thermoset solid material offering a distinct combination of structural strength, adhesion, electrical insulation, thermal or chemical resistance and corrosion protection that is well-suited to coatings and composites applications. SER is processed further with BisA to meet specific end market applications. While LER and SER are sold externally, a significant portion of LER production is further converted into CER where value-added modifications produce higher margin resins.

Our Epoxy segment maintains strong relationships with Dow as both a customer and supplier. These relationships are maintained through long-term cost based contracts that provide us with a reliable supply of key raw materials. Key products sold to Dow include aromatics and key raw materials received from Dow include benzene and propylene.

The Epoxy segment's production economics benefit from its integration into chlor alkali and aromatics which are key inputs in epoxy production. This fully integrated structure provides both access to low cost materials and significant operational flexibility. The Epoxy segment operates an integrated aromatics production chain producing cumene, phenol, acetone and BisA for internal consumption and external sale. The Epoxy segment's consumption of chlorine enables the Chlor Alkali Products and Vinyls segment to generate caustic soda production and sales. Chlorine used in our Epoxy segment is transferred at cost from the Chlor Alkali Products and Vinyls segment.

The following table lists principal products and services of our Epoxy segment.

Products & Services	***Major End Uses***	***Plants & Facilities***	***Major Raw Materials & Components for Products/Services***
Allylics (allyl chloride, epichlorohydrin and glycerin) & aromatics (acetone, bisphenol, cumene and phenol)	Manufacturers of polymers, resins and other plastic materials, water purification, and pesticides	Freeport, TX Stade, Germany Terneuzen, Netherlands	benzene, caustic soda, chlorine, propylene
Liquid epoxy resin/solid epoxy resin	Adhesives, paint and coatings, composites and flooring	Freeport, TX Guaruja, Brazil Stade, Germany	bisphenol, caustic soda, epichlorohydrin
Converted epoxy resins and additives	Electrical laminates, paint and coatings, wind blades, electronics and construction	Baltringen, Germany Freeport, TX Guaruja, Brazil Gumi, South Korea Pisticci, Italy Rheinmunster, Germany Roberta, GA Stade, Germany Zhangjiagang, China	liquid epoxy resins, solid epoxy resins

Strategies

Focus on Return to the ECU. The Epoxy segment is focused on maximizing return to the ECU by targeting participation and improving margins in EPI, LER, and derivative applications with the highest return to the ECU.

Drive Productivity to Sustain Our Cost Advantage. The Epoxy segment continues to drive productivity cost improvements through the entire supply chain to build on our position as the low cost producer of EPI and LER in the Americas and Europe. We expect to reduce structural costs in applications that do not fit our strategic model.

Capitalize on Aromatics Assets. The Epoxy segment utilizes our Aromatics position as a low-cost feedstock for LER and derivative applications while seeking the highest return opportunities for Aromatics assets.

Winchester

Products and Services

In 2021, Winchester is in its 155th year of operation and its 91st year as part of Olin. Winchester is a premier developer and manufacturer of small caliber ammunition for sale to domestic and international retailers (commercial customers), law enforcement agencies and domestic and international militaries. We believe we are a leading U.S. producer of ammunition for recreational shooters, hunters, law enforcement agencies and the U.S. Armed Forces. Winchester also manufacturers industrial products that have various applications in the construction industry.

On October 1, 2020, Winchester assumed full management and operational control of the Lake City Army Ammunition Plant (Lake City) in Independence, MO. The United States Army selected Winchester to operate and manage Lake City in September 2019. The contract is for the production of small caliber military ammunition, including 5.56mm, 7.62mm, and .50 caliber rounds, as well as certain cartridges and casings. The contract also allows for the production of certain ammunition for commercial customers. The contract has an initial term of seven years and may be extended by the United States Army for up to three additional years.

Our legendary Winchester® product line includes all major gauges and calibers of shotgun shells, rimfire and centerfire ammunition for pistols and rifles, reloading components and industrial cartridges. We believe we are a leading U.S. supplier of small caliber commercial ammunition.

Winchester has strong relationships throughout the sales and distribution chain and strong ties to traditional dealers and distributors. Winchester has also built its business with key high-volume mass merchants and specialty sporting goods retailers. Winchester has consistently developed industry-leading ammunition, which is recognized in the industry for manufacturing excellence, design innovation and consumer value. Winchester's new ammunition products continue to receive awards from major industry publications and organizations, with recent awards including: *American Rifleman* magazine's

Golden Bullseye Award as "Ammunition Product of the Year" in 2020; *Guns & Ammo* magazine's "Ammunition of the Year" award in 2019; *National Association of Sporting Goods Wholesalers* in partnership with the *Professional Outdoor Media Association*'s Caliber Award for "Best New Ammunition" in 2019; and *American Hunter* magazine's Golden Bullseye Award as "Ammunition Product of the Year" in 2018.

Winchester purchases raw materials such as copper-based strip and ammunition cartridge case cups and lead from vendors based on a conversion charge or premium. These conversion charges or premiums are in addition to the market prices for metal as posted on exchanges such as the Commodity Exchange, or COMEX, and London Metals Exchange, or LME. Winchester's other main raw material is propellant, which is purchased predominantly from one of the U.S.'s largest propellant suppliers.

The following table lists principal products and services of our Winchester segment.

Products & Services	***Major End Uses***	***Plants & Facilities***	***Major Raw Materials & Components for Products/Services***
Winchester® sporting ammunition (shotshells, small caliber centerfire & rimfire ammunition)	Hunters & recreational shooters, law enforcement agencies	East Alton, IL Independence, MO* Oxford, MS	brass, lead, steel, plastic, propellant, explosives
Small caliber military ammunition	Infantry and mounted weapons	East Alton, IL Independence, MO* Oxford, MS	brass, lead, propellant, explosives
Industrial products (8 gauge loads & powder-actuated tool loads)	Maintenance applications in power & concrete industries, powder-actuated tools in construction industry	East Alton, IL Oxford, MS	brass, lead, plastic, propellant, explosives

*Govenment-owned, contractor-operated (GOCO) facility

Strategies

Maximize Existing Strengths. Winchester will increase our value by strengthening our leadership position in small caliber ammunition through all of the customer segments that we serve – Commercial, Military, Law Enforcement, and Industrial. With one of the world's largest small caliber ammunition manufacturing footprint, we will leverage employee engagement, engineering, and process excellence across our three production sites.

Innovative Solutions. Winchester will continue building on our strong reputation as an industry innovator with a long record of meeting the needs of recreational shooters, first responders, and the modern warfighter. We will drive value for our business through developing market driven new products and delivering engineered solutions for our customers.

Productivity Improvement. Winchester will leverage our continuous improvement process to increase productivity through optimizing our people, processes, and equipment. We will continue to modernize our facilities and equipment for productivity as well as improved safety and environmental footprint.

INTERNATIONAL OPERATIONS

Olin has an international presence, including the geographic regions of Europe, Asia Pacific and Latin America. Approximately 36% of Olin's 2020 sales were generated outside of the U.S., including 25% of our Chlor Alkali Products and Vinyls 2020 segment sales, 67% of our Epoxy 2020 segment sales and 7% of our Winchester 2020 segment sales. See Note 20 "Segment Information" of the notes to consolidated financial statements contained in Item 8, for geographic segment data. We are incorporating our segment information from that Note into this section of our Form 10-K.

CUSTOMERS AND DISTRIBUTION

Products we sell to industrial or commercial users or distributors for use in the production of other products constitute a major part of our total sales. We sell some of our products, such as epoxy resins, caustic soda and sporting ammunition, to a large number of users or distributors, while we sell other products, such as chlorine and chlorinated organics, in substantial quantities to a relatively small number of industrial users. Olin has a significant relationship with Dow, who was our largest customer by revenue in 2020, representing approximately 11% of our total sales. We expect this relationship to continue to be significant to Olin and to represent approximately 10% of our annual sales in 2021. No other single customer accounted for more than 5% of sales. We discuss the customers for each of our three business segments in more detail under "Products and Services."

We market most of our products and services primarily through our sales force and sell directly to various industrial customers, mass merchants, retailers, wholesalers, other distributors and the U.S. Government and its prime contractors.

Sales to all U.S. Government agencies and sales under U.S. Government contracting activities in total accounted for approximately 3% of sales in 2020. Because we engage in some government contracting activities and make sales to the U.S. Government, we are subject to extensive and complex U.S. Government procurement laws and regulations. These laws and regulations provide for ongoing government audits and reviews of contract procurement, performance and administration.
Failure to comply, even inadvertently, with these laws and regulations and with laws governing the export of munitions and other controlled products and commodities could subject us or one or more of our businesses to civil and criminal penalties, and under certain circumstances, suspension and debarment from future government contracts and the exporting of products for a specified period of time.

BACKLOG

The total amount of estimated backlog was approximately $2,175 million and $151 million as of January 31, 2021 and 2020, respectively. The backlog orders are associated with contractual orders in our Winchester business. Backlogs in our other businesses are not significant. Backlog is comprised of all open customer orders which have been received, but not yet shipped. The backlog was estimated based on expected volume to be shipped from firm contractual orders, which are subject to customary terms and conditions, including cancellation and modification provisions. During 2020, consumer purchases of ammunition increased significantly above normal demand levels. The increase in demand has been across all of Winchester's commercial product offerings. Our ability to fulfill the backlog could be constrained due to limitations on our production capacity. Approximately 53% of contracted backlog as of January 31, 2021 is expected to be fulfilled during 2021, with the remainder expected to be fulfilled during 2022.

COMPETITION

We are in active competition with businesses producing or distributing the same or similar products, as well as, in some instances, with businesses producing or distributing different products designed for the same uses.

Chlor alkali manufacturers in North America, with approximately 17 million tons of chlorine and 18 million tons of caustic soda capacity, account for approximately 16% of worldwide chlor alkali production capacity. In 2020, we have the largest chlor alkali capacity in North America and globally. While the technologies to manufacture and transport chlorine and caustic soda are widely available, the production facilities require large capital investments, and are subject to significant regulatory and permitting requirements. Approximately 76% of the total North American chlor alkali capacity is located in the U.S. Gulf Coast region. There is a worldwide market for caustic soda, which attracts imports and allows exports depending on market conditions. Other large chlor alkali producers in North America include The Occidental Petroleum Corporation (Oxy) and Westlake Chemical Corporation (Westlake).

We are also a leading integrated global producer of chlorinated organic products with a strong cost position due to our scale and access to chlor alkali feedstocks. This industry includes large diversified producers such as Oxy, Westlake, Inovyn and KEM ONE, as well as multiple producers located in China.

We are a major global fully integrated epoxy producer, with access to key low cost feedstocks and a cost advantaged infrastructure. With its advantaged cost position, the Epoxy segment is among the lowest cost producers in the world. The markets in which our Epoxy segment operates are highly competitive and are dependent on significant capital investment, the development of proprietary technology and maintenance of product research and development. Among our competitors are Huntsman Corporation (Huntsman) and Hexion, Inc., as well as multiple producers located in Asia.

We believe our Winchester business is one of the largest global manufacturers of commercial small caliber ammunition. Our Winchester business, Vista Outdoor Inc. (Vista), and Remington Outdoor Company, Inc. (Remington) are among the largest commercial ammunition manufacturers in the U.S. In October 2020, Vista acquired the Remington ammunition business in the bankruptcy auction of Remington's assets. The ammunition industry is highly competitive with Olin, Vista and numerous smaller domestic manufacturers and foreign producers competing for sales to the commercial ammunition customers. Many factors influence our ability to compete successfully, including price, delivery, service, performance, product innovation and product recognition and quality, depending on the product involved.

HUMAN CAPITAL

Olin maintains a global workforce to support our operations. We are focused on supporting our global workforce through a variety of factors, which include benefits and compensation, a focus on diversity and inclusion and professional development. We strive to provide our employees with a safe and comfortable environment which allows us to achieve our internal and external goals, while being committed to safely producing and distributing our products.

Olin senior management provides oversight for benefits and compensation of our workforce in a variety of ways, including periodic compensation benchmarking, implementation and adaptation of various employee benefit programs, primarily health and other related benefits, review of certain employee post-retirement benefits and accessibility of employee assistance programs. Our human resources department oversees these programs to ensure our benefits and compensation are competitive. We have both salaried employee and hourly employee structures in place to compensate employees. Our benefits and compensation structures allow Olin to attract and retain a workforce that has exceptional talent which fosters achievement of Olin's goals and objectives. Separately, our Board of Directors maintains a Compensation Committee which sets policies, develops and monitors strategies for and administers the programs that are used to compensate our CEO and other senior executives.

Olin is committed to lifting people through diversity and inclusion. The insights provided by our workforce through various skills, backgrounds and experiences that each of our employees brings will lead us to future innovations which will reduce costs, reduce our environmental footprint, improve our ability to serve the world and keep our employees healthier and safer. We uphold the diversity of our employees to embolden inclusive dialogue, creative ideas, and innovative solutions to cultivate lasting, positive impacts for our customers, employees, communities, and shareholders. In our support of diversity and inclusion objectives, approximately 26% of our global workforce is comprised of women, and approximately 27% of our management roles are held by women. Our goal is to continue to expand women in leadership positions by approximately 10% by 2025. Our largest concentration of employees is located in the U.S., of which 29% are minorities.

We also strive for continued professional development of our workforce. We never stop learning and Olin provides a wide range of employee development and productivity programs. These opportunities help our employees improve and grow, ensuring that each employee understands our values and commitment to one another. Our learning platform focuses on fostering additional learning opportunities which allow our people to build meaningful careers. As part of our commitment to professional development, we offer undergraduate and graduate tuition assistance to eligible employees up to a maximum of $10,000 per year. We regularly review talent development and succession plans to identify and develop a pipeline of talent to maintain business operations. We also have a well-established performance management process, which includes, at a minimum, annual year-end reviews and development discussions. Our talent management process seeks to provide employees on-going feedback to enhance their performance.

As of December 31, 2020, we had approximately 8,000 employees, with 6,800 working in the U.S., including approximately 1,700 employees at Lake City which is a GOCO facility, and 1,200 working in foreign countries. For our foreign country locations, approximately 56% are located in Europe, Middle East, Africa, and India, 20% in Asia Pacific, 14% in Canada, and 10% in Latin America. Approximately 48% of our total employees are employed in our Chlor Alkali Products and Vinyls and Epoxy businesses, 49% are employed in our Winchester business, including 21% at Lake City, and 3% are employed in Corporate functions. Various labor unions represent a significant number of our hourly-paid employees for collective bargaining purposes.

The following labor contract will be required to be negotiated in 2021:

Location	***Number of Employees***	***Expiration Date***
East Alton (Winchester)	573	December 2021

While we believe our relations with our employees and their various representatives are generally satisfactory, we cannot assure that we can conclude this labor contract or any other labor agreements without work stoppages and cannot assure that any work stoppages will not have a material adverse effect on our business, financial condition or results of operations.

RESEARCH ACTIVITIES; PATENTS

Our research activities are conducted on a product-group basis at a number of facilities. Company-sponsored research expenditures were $16.6 million, $16.5 million and $14.9 million in 2020, 2019 and 2018, respectively.

We own or license a number of patents, patent applications and trade secrets covering our products and processes. We believe that, in the aggregate, the rights under our patents and licenses are important to our operations, but we do not consider any individual patent, license or group of patents and licenses related to a specific process or product to be of material importance to our total business.

SEASONALITY

Our sales are affected by economic downturns and the seasonality of several industries we serve, including building and construction, coatings, oil and gas, infrastructure, electronics, automotive, water treatment, refrigerants and ammunition. The seasonality of the ammunition business is typically driven by the U.S. fall hunting season. Our chlor alkali businesses generally experience their highest level of activity during the spring and summer months, particularly when construction, refrigerants, coatings and infrastructure activity is higher. The chlor alkali industry experiences changes in demand for each of the co-produced products and as a result of the large increments in which new capacity is added and removed. Because chlorine and caustic soda are produced in a fixed ratio, the supply of one product can be constrained both by the physical capacity of the production facilities and/or by the ability or desire to sell the co-produced product. Prices for both products respond rapidly to changes in supply and demand. We have significant diversification of our chlorine outlets, which allows us to better manage this co-product relationship.

RAW MATERIALS AND ENERGY

Basic raw materials are processed through an integrated manufacturing process to produce a number of products that are sold at various points throughout the process. We purchase a portion of our raw material requirements and also utilize internal resources, co-products and finished goods as raw materials for downstream products. We believe we have reliable sources of supply for our raw materials under normal market conditions. However, we cannot predict the likelihood or impact of any future raw material shortages.

The principal basic raw materials for our production of Chlor Alkali Products and Vinyls' products are electricity, salt, ethylene and methanol. Electricity is the predominant energy source for our manufacturing facilities. Approximately 72% of our electricity is generated from natural gas or hydroelectric sources. We have long-term power supply contracts with Dow in addition to utilizing our own power assets, which allow for cost differentiation at specific U.S. manufacturing sites. A portion of our purchases of raw materials, including ethylene, are made under long-term supply agreements, while approximately 59% of the salt used in our Chlor Alkali Products and Vinyls segment is produced from internal resources. Methanol is sourced domestically and internationally primarily from large producers.

The Epoxy segment's principal raw materials are chlorine, benzene, propylene and aromatics, which consist of cumene, phenol, acetone and BisA. A portion of our purchases of raw materials, including benzene, propylene and a portion of our aromatics requirements, are made under long-term supply agreements, while a portion of our aromatics requirements are produced from our integrated production chain. Chlorine is predominately sourced from our Chlor Alkali Products and Vinyls segment.

Lead, brass and propellant are the principal raw materials used in the Winchester business. We typically purchase our ammunition cartridge case cups and copper-based strip, and propellants pursuant to multi-year contracts.

We provide additional information with respect to specific raw materials in the tables set forth under "Products and Services."

ENVIRONMENTAL AND TOXIC SUBSTANCES CONTROLS

As is common in our industry, we are subject to environmental laws and regulations related to the use, storage, handling, generation, transportation, emission, discharge, disposal and remediation of, and exposure to, hazardous and non-hazardous substances and wastes in all of the countries in which we do business.

The establishment and implementation of national, state or provincial and local standards to regulate air, water and land quality affect substantially all of our manufacturing locations around the world. Laws providing for regulation of the manufacture, transportation, use and disposal of hazardous and toxic substances, and remediation of contaminated sites have imposed additional regulatory requirements on industry, particularly the chemicals industry. In addition, implementation of environmental laws has required and will continue to require new capital expenditures and will increase operating costs.

We are a party to various government and private environmental actions associated with former waste disposal sites and past manufacturing facilities. Charges to income for investigatory and remedial efforts were $20.9 million, $25.3 million and $7.3 million for the years ended December 31, 2020, 2019 and 2018, respectively. These charges may be material to operating results in future years. These charges do not include insurance recoveries for costs incurred and expensed in prior periods.

See our discussion of our environmental matters contained in Note 21 "Environmental" of the notes to consolidated financial statements contained in Item 8 and under the heading "Environmental Matters" in Item 7—"Management's Discussion and Analysis of Financial Condition and Results of Operations."

CORPORATE RESPONSIBILITY

At Olin, we are committed to corporate responsibility to ensure the long-term success of our business, our collective global society and the well-being of our environment. We focus our corporate responsibility efforts on the areas of: (1) environment, health, safety and security stewardship, (2) sustainability and governance and (3) product stewardship. We value collaboration and commit to working with other organizations to encourage collective action for improving corporate responsibility. Additional information related to our corporate responsibility initiatives, practices, activities, goals and related information, as well as future updates, can be found in the Corporate Responsibility section of our website at www.olin.com, including our 2020 Sustainability Report under the section Sustainability Success.

Environment, Health, Safety and Security Stewardship

Olin is strongly committed to excellence in protecting the environment, health, safety and security of our employees and those who live and work around our plants. Our operations worldwide comply with all local requirements and implement other standards as required to protect the environment, health, safety and security of our operations. We are committed to the guiding principles of the chemical industry's Responsible Care® initiative around the globe and we use our management system to drive continuous improvement and achieve excellence in environmental, health, safety, process safety and security performance. Our safety, health and environmental strategy and goals are designed to sustain our drive to zero incidents. Relentlessly and responsibly, we constantly emphasize the importance of monitoring the safety, security and environmental impact of our plants and processes. Through our day-to-day vigilance, Olin strives to continue to be recognized as one of the industry's best performers.

Our corporate values — Act with Integrity, Drive Innovation and Improvement and Lift Olin People — are part of our culture. These values are also reflected in our Environment, Health, Safety and Security (EHS&S) policy and practice. Olin leadership visibly performs and guides the organization to conduct business in a manner that protects and increasingly benefits our employees, business partners and the communities in which we live. All employees have responsibilities within our management systems necessary to sustain our drive to zero incidents. Full year 2020 was the third consecutive year that Olin achieved a decline for total safety and environmental events, which includes recordable injuries, process safety events, environmental events, and distribution events.

Sustainability and Governance

We strongly believe in meeting the needs of the present without compromising the needs of future generations. We recognize the impact our company has on our natural resources and our responsibility to stewardship of people and the planet. This means striving for a company culture responsible to the ongoing economic, social and governance ideals of our employees and shareholders.

At Olin, we integrate sustainability in everything we do as a Responsible Corporate Citizen. We value and respect our people, the communities in which we operate, our customers and the environment. We commit to making a contribution to the protection of the world and its future condition through the safety and efficiency of our business practices - from supply to manufacture to delivery and ultimately the end-use of our products. Our focus on continuous improvement throughout our history drives our business. Our inaugural Sustainability Report describes our core tenets in this area. Focused on four pillars, we are challenging ourselves to advance those opportunities where our impact on the planet, our operations and our people and communities is most meaningful:

Energy and Climate Mindfulness
Olin systematically and strategically manages our energy and carbon footprint, driving greater efficiency and increasing utilization of renewable resources.

Resource Efficiency
Olin effectively manages critical resources to minimize consumption and waste, increase reuse and recycle of materials, drive operational efficiency, and be good stewards of protection for the environment.

Product Sustainability and Commercial Outreach
Olin's products and processes contribute to sustainable opportunities and innovation, enabling safe handling and distribution throughout the supply chain.

Employee and Community Care
Olin provides equal opportunities to employees and ensures the ongoing safety and livelihood of our people and communities.

We have developed a strategy and global initiative to manage and track our greenhouse gas (GHG) emissions, water usage, waste disposal and energy consumption and efficiency at our facilities. We are committed to improving our use of resources, acting on opportunities to reduce our environmental footprint and setting targets for improvement. We understand that maintaining safe, sustainable operations has an impact on us, our communities, the environment and our collective future. We continue to invest to develop safer, cleaner and more efficient products and processes. Our social and governance practices drive safety, equality and fairness for our operations and ensure transparency of our practices.

Product Responsibility

We take great pride in distributing and handling our products safely and enabling our customers to do the same. Our product stewardship and quality practices are aligned with our core values, the American Chemistry Council's Product Safety Code under Responsible Care®, and other globally recognized standards. We apply these standards to our chemical business segments and relevant subsidiaries to ensure compliance with applicable global regulations, evaluation, continuous improvement and transparency of relevant production and product or formulation information. Additionally, Winchester ammunition is designed and manufactured in accordance with the voluntary industry standards published by the Sporting Arms and Ammunition Manufacturers' Institute. We are deeply committed to ammunition education and advocate strongly for the belief that it is important to take the necessary steps to be trained and educated when handling and using a firearm for recreational purposes, both for experienced and novice participants. Our goal is to meet or exceed guidelines in every instance. Olin Leadership demonstrates its commitment to these standards through active participation and communication concerning product safety, within our organization and to external stakeholders.

Item 1A. RISK FACTORS

In addition to the other information in this Form 10-K, the following factors should be considered in evaluating Olin and our business. All of our forward-looking statements should be considered in light of these factors. Additional risks and uncertainties that we are unaware of or that we currently deem immaterial also may become important factors that affect us.

Business, Industry and Operational Risks

Sensitivity to Global Economic Conditions—Our operating results could be negatively affected during economic and industry downturns.

The businesses of most of our customers are, to varying degrees, cyclical and have historically experienced periodic downturns. These economic and industry downturns have been characterized by diminished product demand, excess manufacturing capacity and, in some cases, lower average selling prices. Therefore, any significant downturn in our customers' businesses or in global economic conditions could result in a reduction in demand for our products and could adversely affect our results of operations or financial condition.

Although a majority of our sales are within North America, a large part of our financial performance is dependent upon a healthy economy beyond North America because we have a significant amount of sales abroad and our customers sell their products abroad. As a result, our business is and will continue to be affected by general economic conditions and other factors in Europe, Asia Pacific, particularly China, and Latin America, including fluctuations in interest rates, customer demand, labor and energy costs, currency changes and other factors beyond our control, such as public health epidemics. The demand for our products and our customers' products is directly affected by such fluctuations. In addition, our customers could decide to move some or all of their production to locations that are more remote from our facilities, and this could reduce demand for our products. We cannot assure you that events having an adverse effect on the industries in which we operate will not occur or continue, such as a downturn in the European, Asian Pacific, particularly Chinese, Latin American, or world economies, increases in interest rates, unfavorable currency fluctuations or prolonged effects of the 2019 Novel Coronavirus (COVID-19) pandemic. Economic conditions in other regions of the world, predominantly Asia and Europe, can increase the amount of caustic soda produced and available for export to North America. The increased caustic soda supply can put downward pressure on our caustic soda prices, negatively impacting our profitability.

Pricing Pressure—Our profitability could be reduced by declines in average selling prices of our products, particularly chlorine and chlorine derivatives and caustic soda.

We experience cycles of fluctuating supply and demand in each of our business segments, particularly in our Chlor Alkali Products and Vinyls segment, which result in changes in selling prices. Periods of high demand, tight supply and increasing operating margins tend to result in increases in capacity and production until supply exceeds demand, generally followed by periods of oversupply and declining prices. Another factor influencing demand and pricing for chlorine and caustic soda is the price of natural gas. Higher natural gas prices increase our customers' and competitors' manufacturing costs, and depending on the ratio of crude oil to natural gas prices, could make our customers less competitive in world markets.

In the chlor alkali industry, price is the major supplier selection criterion. Pricing is subject to a variety of factors, some of which are outside of our control. Decreases in the average selling prices of our products could have a material adverse effect on our profitability. While we strive to maintain or increase our profitability by reducing costs through improving production efficiency, emphasizing higher margin products and by controlling transportation, selling and administration expenses, we cannot assure you that these efforts will be sufficient to fully offset the effect of possible decreases in pricing on operating results.

We cannot assure you that pricing or profitability in the future will be comparable to any particular historical period, including the most recent period shown in our operating results. We cannot assure you that the chlor alkali industry will not experience adverse trends in the future, or that our business, financial condition and results of operations will not be adversely affected by them.

Our Winchester and Epoxy segments are also subject to pricing pressures. Selling prices of ammunition and epoxy materials are affected by changes in raw material costs and availability, customer demand and industry production capacity. Declines in average selling prices of products of our Winchester and Epoxy segments could adversely affect our profitability.

Change in Operating Model —Our operating results could be negatively impacted if we do not successfully implement our operating model in our chemicals businesses.

We have adopted a strategic operating model in our chemicals businesses that prioritizes ECU margins over sales volume. This model represents a change to our Chlor Alkali Products and Vinyls and Epoxy businesses. The model necessitates managing production rates to mitigate exposure to the weaker demand side of the ECU and maximize value from the stronger side of the ECU. The implementation of the model may not be successful. For example, we may not be able to consistently achieve higher margins or the margin improvement achieved might be more than offset by the impact from lower sales volumes, either of which could have a material adverse effect on our operating results and cash flows.

Some of our assets were designed to operate at consistently high operating rates. If we operate at lower operating rates for extended periods or make frequent changes to operating rates, our assets may become less reliable or may require additional maintenance or capital investment, which could have a material adverse impact on our operating results and cash flows. Additionally, we may not be able to attract, develop, or retain the skills necessary to effectively implement the model. Our model is dependent on implementing changes to the way we transact business with customers and other third parties. Customers or third parties may not be willing to transact with us on terms acceptable to us or at all. If we fail to effectively execute our model, our operating results may fail to meet expectations and our business, financial condition, and results of operations could be adversely impacted.

Suppliers—We rely on a limited number of third-party suppliers for specified feedstocks and services.

We obtain a significant portion of our raw materials from a few key suppliers. If any of these suppliers fail to meet their obligations under present or any future supply agreements, we may be forced to pay higher prices or incur higher costs to obtain the necessary raw materials. Any interruption of supply or any price increase of raw materials could have a material adverse effect on our business, financial condition and results of operations. We have entered into long-term agreements with Dow to provide specified feedstocks and services for a number of our facilities. These facilities are dependent upon Dow's infrastructure for services such as wastewater and ground water treatment. Any failure of Dow to perform its obligations under those agreements could adversely affect the operation of the affected facilities and our business, financial condition and results of operations. Most of these agreements are automatically renewable after their initial terms, but may be terminated by us or Dow after specified notice periods. If we are required to obtain an alternate source for these feedstocks or services, we may not be able to obtain pricing on as favorable terms. Additionally, we may be forced to pay additional transportation costs or to invest in capital projects for pipelines or alternate facilities to accommodate railcar or other delivery methods or to replace other services.

A vendor may choose, subject to existing contracts, to modify its relationship due to general economic concerns or concerns relating to the vendor or us, at any time. Any significant change in the terms that we have with our key suppliers could materially and adversely affect our business, financial condition and results of operations, as could significant additional requirements from suppliers that we provide them additional security in the form of prepayments or posting letters of credit.

Cost Control—Our profitability could be reduced if we experience increasing raw material, utility, transportation or logistics costs, or if we fail to achieve targeted cost reductions.

Our operating results and profitability are dependent upon our continued ability to control, and in some cases reduce, our costs. If we are unable to do so, or if costs outside of our control, particularly our costs of raw materials, utilities, transportation and similar costs, increase beyond anticipated levels, our profitability will decline.

For example, if our feedstock and energy costs increase, and we are unable to pass the increased costs on to customers, our profitability in our Chlor Alkali Products and Vinyls and Epoxy segments would be negatively affected. Similarly, costs of commodity metals and other materials used in our Winchester business, such as copper and lead, can vary. If we experience significant increases in these costs and are unable to raise our prices to offset the higher costs, the profitability in our Winchester business would be negatively affected.

Raw Materials—Availability of purchased feedstocks and energy, and the volatility of these costs, impact our operating costs and add variability to earnings.

Purchased feedstock and energy costs account for a substantial portion of our total production costs and operating expenses. We purchase certain raw materials as feedstocks.

Feedstock and energy costs generally follow price trends in crude oil and natural gas, which are sometimes volatile. Ultimately, the ability to pass on underlying cost increases in a timely manner or at all is partially dependent on market conditions. Conversely, when feedstock and energy costs decline, selling prices generally decline as well. As a result, volatility in these costs could impact our business, financial condition and results of operations.

If the availability of any of our principal feedstocks is limited or we are unable to obtain natural gas or energy from any of our energy sources, we may be unable to produce some of our products in the quantities demanded by our customers, which could have a material adverse effect on plant utilization and our sales of products requiring such raw materials. We have long-term supply contracts with various third parties for certain raw materials, including ethylene, electricity, propylene and benzene. As these contracts expire, we may be unable to renew these contracts or obtain new long-term supply agreements on terms comparable or as favorable to us, depending on market conditions, which may have a material adverse effect on our business, financial condition and results of operations. In addition, many of our long-term contracts contain provisions that allow our suppliers to limit the amount of raw materials shipped to us below the contracted amount in force majeure or similar circumstances. If we are required to obtain alternate sources for raw materials because our suppliers are unwilling or unable to perform under raw material supply agreements or if a supplier terminates its agreements with us, we may not be able to obtain these raw materials from alternative suppliers or obtain new long-term supply agreements on terms comparable or as favorable to us.

Third-Party Transportation—We rely heavily on third-party transportation, which subjects us to risks and costs that we cannot control, and which risks and costs may have a material adverse effect on our financial position or results of operations.

We rely heavily on railroad, truck, marine vessel, barge and other shipping companies to transport finished products to customers and to transport raw materials to the manufacturing facilities used by each of our businesses. These transport operations are subject to various hazards and risks, including extreme weather conditions, work stoppages and operating hazards, as well as domestic and international transportation and maritime regulations. In addition, the methods of transportation we utilize, including shipping chlorine and other chemicals by railroad and by barge, may be subject to additional, more stringent and more costly regulations in the future. If we are delayed or unable to ship finished products or unable to obtain raw materials as a result of any such new or modified regulations or public policy changes related to transportation safety, or these transportation companies' failure to operate properly, or if there are significant changes in the cost of these services due to new additional regulations, or otherwise, we may not be able to arrange efficient alternatives and timely means to obtain raw materials or ship goods, which could result in a material adverse effect on our business, financial position or results of operations. If any third-party railroad that we utilize to transport chlorine and other chemicals ceases to transport certain hazardous materials, or if there are significant changes in the cost of shipping hazardous materials by rail or otherwise, we may not be able to arrange efficient alternatives and timely means to deliver our products or at all, which could result in a material adverse effect on our business, financial position or results of operations.

Production Hazards—Our facilities are subject to operating hazards, which may disrupt our business.

We are dependent upon the continued safe and reliable operation of our production facilities. Our production facilities are subject to hazards associated with the manufacture, handling, storage and transportation of chemical materials and products and ammunition, including leaks and ruptures, explosions, fires, inclement weather and natural disasters, unexpected utility disruptions or outages, unscheduled downtime, equipment failure, terrorism, transportation interruptions, transportation accidents involving our chemical products, chemical spills and other discharges or releases of toxic or hazardous substances or gases and environmental hazards. Due to the integrated nature of our large chemical sites, an incident at one plant could impact production across multiple plants at a facility. From time to time in the past, we have had incidents that have temporarily shut down or otherwise disrupted our manufacturing, causing production delays and resulting in liability for workplace injuries and fatalities. Some of our operations involve the manufacture and/or handling of a variety of explosive and flammable materials. Use of our products by our customers could also result in liability if an explosion, fire, spill or other accident were to occur. We cannot assure you that we will not experience these types of incidents in the future or that these incidents will not result in production delays or otherwise have a material adverse effect on our business, financial condition or results of operations. Major hurricanes have caused significant disruption in our operations on the U.S. Gulf Coast, logistics across the region and the supply of certain raw materials, which have had an adverse impact on volume and cost for some of our products. Due to the substantial presence we have on the U.S. Gulf Coast, similar severe weather conditions or other natural phenomena in the future could negatively affect our results of operations, for which we may not be fully insured.

Information Security—A failure of our information technology systems, or an interruption in their operation due to internal or external factors including cyber-attacks, could have a material adverse effect on our business, financial condition or results of operations.

Our operations are dependent on our ability to protect our information systems, computer equipment and information databases from systems failures. We rely on both internal information technology systems and certain external services and service providers to manage the day-to-day operation of our business, operate elements of our manufacturing facilities, manage relationships with our employees, customers and suppliers, fulfill customer orders and maintain our financial and accounting records. Failure of any one or more than one of our information technology systems could be caused by internal or external events, such as incursions by intruders or hackers, computer viruses, cyber-attacks, failures in hardware or software, or power or telecommunication fluctuations or failures. The failure of our information technology systems to perform as anticipated for any reason or any significant breach of security could disrupt our business and result in numerous adverse consequences, including reduced effectiveness and efficiency of operations, increased costs or loss of important information, any of which could have a material adverse effect on our business, financial condition or results of operations. We have technology and information security processes, periodic external service and service provider reviews, insurance policies and disaster recovery plans in place to mitigate our risk to these vulnerabilities. However, these measures may not be adequate to ensure that our operations will not be disrupted or our financial impact minimalized, should such an event occur.

Indebtedness—Our indebtedness could adversely affect our financial condition.

As of December 31, 2020, we had $3,863.8 million of indebtedness outstanding. Outstanding indebtedness does not include amounts that could be borrowed under our $800.0 million senior secured revolving credit facility, under which $799.6 million was available for borrowing as of December 31, 2020 because we had issued $0.4 million of letters of credit. As of December 31, 2020, our indebtedness represented 72.7% of our total capitalization. At December 31, 2020, $26.3 million of our indebtedness was due within one year. Despite our level of indebtedness, we expect to continue to have the ability to borrow additional debt, but we cannot be certain that additional debt will be available on terms acceptable to us or at all.

Our indebtedness could have important consequences, including but not limited to:

- limiting our ability to fund working capital, capital expenditures, and other general corporate purposes;
- limiting our ability to accommodate growth by reducing funds otherwise available for other corporate purposes, which in turn could prevent us from fulfilling our obligations under our indebtedness;
- limiting our operational flexibility due to the covenants contained in our debt agreements;
- to the extent that our debt is subject to floating interest rates, increasing our vulnerability to fluctuations in market interest rates;
- limiting our ability to pay cash dividends;
- limiting our flexibility for, or reacting to, changes in our business or industry or economic conditions, thereby limiting our ability to compete with companies that are not as highly leveraged; and
- increasing our vulnerability to economic downturns.

Our ability to generate sufficient cash flow from operations to make scheduled payments on our debt will depend on a range of economic, competitive and business factors, many of which are outside our control. There can be no assurance that our business will generate sufficient cash flow from operations to make these payments. If we are unable to meet our expenses and debt obligations, we may need to refinance all or a portion of our indebtedness before maturity, sell assets or issue additional equity. We may not be able to refinance any of our indebtedness, sell assets or issue additional equity on commercially reasonable terms or at all, which could cause us to default on our obligations and impair our liquidity. Our inability to generate sufficient cash flow to satisfy our debt obligations, or to refinance our debt obligations on commercially reasonable terms, would have a material adverse effect on our business, financial condition and results of operations, as well as on our ability to satisfy our debt obligations.

COVID-19 Pandemic—The COVID-19 pandemic and the global response to the pandemic could have a material adverse impact on our business, financial condition, or results of operations.

The COVID-19 global pandemic, and the various governmental, business, and consumer responses to this pandemic, have caused significant disruptions in the U.S. and global economies, which has negatively impacted the demand for several of the products produced by our Chlor Alkali Products and Vinyls and Epoxy businesses resulting in lower volumes and pricing.

As a result, the COVID-19 pandemic has significantly impacted our results of operations and could continue to have negative impacts on our business. These impacts could include plant closures or operating reductions, volatility and decrease in demand for our products, and supply chain interruptions. These impacts could become more widespread or prolonged as the pandemic continues. The extent to which the COVID-19 pandemic impacts our results will depend on future developments that are outside of our control and highly uncertain, including the severity and duration of the pandemic, the domestic and international actions that are taken in response, and the extent and severity of any resulting economic or industry downturn.

Credit Facility—Weak industry conditions could affect our ability to comply with the financial maintenance covenants in our senior secured credit facility.

Our senior secured credit facility includes certain financial maintenance covenants requiring us to not exceed a maximum secured leverage ratio and to maintain a minimum coverage ratio.

Depending on the magnitude and duration of economic or industry downturns affecting our businesses, including deterioration in prices and volumes, there can be no assurance that we will continue to be in compliance with these ratios. If we fail to comply with either of these covenants in a future period and are not able to obtain waivers from the lenders, we would need to refinance our current senior secured credit facility. However, there can be no assurance that such refinancing would be available to us on terms that would be acceptable to us or at all.

Imbalance in Demand for Our Chlor Alkali Products—A loss of a substantial customer for either our chlorine or caustic soda could cause an imbalance in customer demand for these products, which could have an adverse effect on our results of operations.

Chlorine and caustic soda are produced simultaneously and in a fixed ratio of 1.0 ton of chlorine to 1.1 tons of caustic soda. The loss of a substantial chlorine or caustic soda customer could cause an imbalance in customer demand for either our chlorine and caustic soda products. An imbalance in customer demand may require Olin to reduce production of both chlorine and caustic soda or take other steps to correct the imbalance. Since Olin cannot store large quantities of chlorine, we may not be able to respond to an imbalance in customer demand for these products quickly or efficiently. If a substantial imbalance occurred, we might need to take actions that could have a material adverse impact on our business, results of operations and financial condition.

Ability to Attract and Retain Qualified Employees—We must attract, retain and motivate key employees, and the failure to do so may adversely affect our business, financial condition or results of operations.

We feel our success depends on hiring, retaining and motivating key employees, including executive officers. We may have difficulty locating and hiring qualified personnel. In addition, we may have difficulty retaining such personnel once hired, and key people may leave and compete against us. The loss of key personnel or our failure to attract and retain other qualified and experienced personnel could disrupt or materially adversely affect our business, financial condition or results of operations. In addition, our operating results could be adversely affected by increased costs due to increased competition for employees or higher employee turnover, which may result in the loss of significant customer business or increased costs.

International Sales and Operations—We are subject to risks associated with our international sales and operations that could have a material adverse effect on our business or results of operations.

Olin has an international presence, including the geographic regions of Europe, Asia Pacific, Latin America and Canada. In 2020, approximately 36% of our sales were generated outside of the United States. These international sales and operations expose us to risks, including:

- difficulties and costs associated with complying with complex and varied laws, treaties, and regulations;
- tariffs and trade barriers;
- outbreaks of pandemics, such as COVID-19, which could cause us and our suppliers and/or customers to temporarily suspend operations in affected areas, restrict the ability of Olin to distribute our products or cause economic downturns that could affect demand for our products;
- changes in laws and regulations, including the imposition of economic or trade sanctions affecting international commercial transactions;
- risk of non-compliance with anti-bribery laws and regulations, such as the U.S. Foreign Corrupt Practices Act;
- restrictions on, or difficulties and costs associated with, the repatriation of cash from foreign countries to

the United States;

- unfavorable currency fluctuations;
- changes in local economic conditions;
- unexpected changes in political or regulatory environments;
- labor compliance and costs associated with a global workforce;
- data privacy regulations;
- difficulties in maintaining overseas subsidiaries and international operations; and
- challenges in protecting intellectual property rights.

Any one or more of the above factors could have a material adverse effect on our business, financial condition or results of operations.

Pension Plans—The impact of declines in global equity and fixed income markets on asset values and any declines in interest rates and/or improvements in mortality assumptions used to value the liabilities in our pension plans may result in higher pension costs and the need to fund the pension plans in future years in material amounts.

We sponsor domestic and foreign defined benefit pension plans for eligible employees and retirees. Substantially all domestic defined benefit pension plan participants are no longer accruing benefits. However, a portion of our bargaining hourly employees continue to participate in our domestic qualified defined benefit pension plans under a flat-benefit formula. Our funding policy for the qualified defined benefit pension plans is consistent with the requirements of federal laws and regulations. Our foreign subsidiaries maintain pension and other benefit plans, which are consistent with local statutory practices. The determinations of pension expense and pension funding are based on a variety of rules and regulations along with economic factors which are outside of our control. These factors include returns on invested assets, the level of certain market interest rates, the discount rates used to determine pension obligations and mortality assumptions used to value liabilities in our pension plans. Changes in these rules and regulations or unfavorable changes to the factors which are used to value the assets and liabilities in our pension plans could impact the calculation of funded status of our pension plans. They may also result in higher pension costs, additional financial statement disclosure, and the need to fund the pension plan.

At December 31, 2020, the projected benefit obligation of $3,199.4 million exceeded the market value of assets in our qualified defined benefit pension plans by $730.3 million, as calculated under Accounting Standards Codification (ASC) 715 "Compensation—Retirement Benefits" (ASC 715). Based on our plan assumptions and estimates, we will not be required to make any cash contributions to the domestic qualified defined benefit pension plan at least through 2021 and we anticipate less than $5 million of cash contributions to international qualified defined benefit pension plans in 2021.

The impact of declines in global equity and fixed income markets on asset values may result in higher pension costs and may increase and accelerate the need to fund the pension plans in future years. For example, holding all other assumptions constant, a 100-basis point decrease or increase in the assumed long-term rate of return on plan assets for our domestic qualified defined benefit pension plan would have decreased or increased, respectively, the 2020 defined benefit pension plan income by approximately $19.8 million. Holding all other assumptions constant for our domestic qualified defined benefit pension plan, a 50-basis point decrease in the discount rate used to calculate pension income for 2020 and the projected benefit obligation as of December 31, 2020 would have decreased pension income by $0.4 million and increased the projected benefit obligation by $174.0 million. A 50-basis point increase in the discount rate used to calculate pension income for 2020 and the projected benefit obligation as of December 31, 2020 for our domestic qualified defined benefit pension plan would have increased pension income by $0.1 million and decreased the projected benefit obligation by $157.0 million.

Credit and Capital Market Conditions—Adverse conditions in the credit and capital markets may limit or prevent our ability to borrow or raise capital.

While we believe we have facilities in place that should allow us to borrow funds as needed to meet our ordinary course business activities, adverse conditions in the credit and financial markets could prevent us from obtaining financing, if the need arises. Our ability to invest in our businesses and refinance or repay maturing debt obligations could require access to the credit and capital markets and sufficient bank credit lines to support cash requirements. Our ability to access credit and capital markets can also depend on our credit rating as determined by reputable credit rating agencies. A significant downgrade in our credit rating could affect our ability to refinance or repay maturing debt obligations, result in increased borrowing costs, decrease the availability of capital from financial institutions or require our subsidiaries to post letters of credit, cash or other assets as collateral with certain counterparties. If we are unable to access the credit and capital markets on commercially reasonable terms, we could experience a material adverse effect on our business, financial position or results of operations.

Asset Impairment—If our goodwill, other intangible assets or property, plant and equipment become impaired in the future, we may be required to record non-cash charges to earnings, which could be significant.

The process of impairment testing for our goodwill involves a number of judgments and estimates made by management including future cash flows, discount rates, profitability assumptions and terminal growth rates with regards to our reporting units. Our internally generated long-range plan includes assumptions regarding pricing and operating forecasts for the chlor alkali industry. If the judgments and estimates used in our analysis are not realized or are affected by external factors, then actual results may not be consistent with these judgments and estimates, and we may be required to record a goodwill impairment charge in the future, which could be significant and have an adverse effect on our financial position and results of operations. During the third quarter of 2020, the carrying values of our Chlor Alkali Products and Vinyls and Epoxy reporting units exceeded the fair values which resulted in pre-tax goodwill impairment charges of $557.6 million and $142.2 million, respectively. The goodwill impairment charge was calculated as the amount that the carrying value of the reporting unit, including any goodwill, exceeded its fair value and therefore the carrying value of our reporting units equal their fair value upon completion of the goodwill impairment test.

We review long-lived assets, including property, plant and equipment and identifiable amortizing intangible assets, for impairment whenever changes in circumstances or events may indicate that the carrying amounts are not recoverable. If the fair value is less than the carrying amount of the asset, an impairment is recognized for the difference. Factors which may cause an impairment of long-lived assets include significant changes in the manner of use of these assets, negative industry or market trends, a significant underperformance relative to historical or projected future operating results, extended period of idleness or a likely sale or disposal of the asset before the end of its estimated useful life. If our property, plant and equipment and identifiable amortizing intangible assets are determined to be impaired in the future, we may be required to record non-cash charges to earnings during the period in which the impairment is determined, which could be significant and have an adverse effect on our financial position and results of operations.

Legal, Environmental and Regulatory Risks

Security and Chemicals Transportation—New regulations on the transportation of hazardous chemicals and/or the security of chemical manufacturing facilities and public policy changes related to transportation safety could result in significantly higher operating costs.

The transportation of our products and feedstocks, including transportation by pipeline, and the security of our chemical manufacturing facilities are subject to extensive regulation. Government authorities at the local, state and federal levels could implement new or stricter regulations that would impact the security of chemical plant locations and the transportation of hazardous chemicals. Our Chlor Alkali Products and Vinyls and Epoxy segments could be adversely impacted by the cost of complying with any new regulations. Our business also could be adversely affected if an incident were to occur at one of our facilities or while transporting products. The extent of the impact would depend on the requirements of future regulations and the nature of an incident, which are unknown at this time.

Effects of Regulation—Changes in or failure to comply with applicable laws or government regulations or policies could have a material adverse effect on our financial position or results of operations.

Legislation or regulations that may be adopted or modified by U.S. or foreign governments, including legislation or regulations intended to address climate change, antitrust and competition laws, tax regulation, import and export duties and quotas and anti-dumping measures and related tariffs could significantly affect the sales, costs and profitability of our business. The chemical and ammunition industries are subject to legislative and regulatory actions, which could have a material adverse effect on our business, financial position or results of operations. Changes to government regulations and laws or changes in their interpretation may reduce the demand for our products, impact our ability to use or manufacture certain products, or limit our ability to implement our strategies, any of which could have a material adverse effect on our business, financial condition and results of operations. A material change in tax laws, treaties or regulations in the jurisdictions in which we operate or a change in their interpretation or application could have a material adverse effect on our business, financial condition and results of operations.

Litigation and Claims—We are subject to litigation and other claims, which could cause us to incur significant expenses.

We are subject to litigation and other claims relating to our present and former operations and could become subject to additional claims in the future, some of which could be material. These proceedings could include contract disputes, antitrust claims, product liability claims, including ammunition and firearms, and proceedings alleging injurious exposure of plaintiffs to various chemicals and other substances (including proceedings based on alleged exposures to asbestos). Frequently, the proceedings alleging injurious exposure involve claims made by numerous plaintiffs against many defendants. Defense of these claims can be costly and time-consuming even if ultimately successful. Because of the inherent uncertainties of legal proceedings, we are unable to predict their outcome and therefore cannot determine whether the financial impact, if any, will be material to our financial position, cash flows or results of operations.

Environmental Costs—We have ongoing environmental costs, which could have a material adverse effect on our financial position or results of operations.

Our operations and assets are subject to extensive environmental, health and safety regulations, including laws and regulations related to air emissions, water discharges, waste disposal and remediation of contaminated sites. The nature of our operations and products, including the raw materials we handle, exposes us to the risk of liabilities, obligations or claims under these laws and regulations due to the production, storage, use, transportation and sale of materials that can adversely impact the environment or cause personal injury, including, in the case of chemicals, unintentional releases into the environment. Environmental laws may have a significant effect on the costs of use, transportation, handling and storage of raw materials and finished products, as well as the costs of storage, handling, treatment, transportation and disposal of wastes. In addition, we are party to various government and private environmental actions associated with past manufacturing facilities and former waste disposal sites. We have incurred, and expect to incur, significant costs and capital expenditures in complying with environmental laws and regulations.

The ultimate costs and timing of environmental liabilities are difficult to predict. Liabilities under environmental laws relating to contaminated sites can be imposed retroactively and on a joint and several basis. One liable party could be held responsible for all costs at a site, regardless of fault, percentage of contribution to the site or the legality of the original disposal. We could incur significant costs, including clean-up costs, natural resource damages, civil or criminal fines and sanctions and third-party lawsuits claiming, for example, personal injury and/or property damage, as a result of past or future violations of, or liabilities under, environmental or other laws.

In addition, future events, such as changes to environmental laws, changes in the interpretation or implementation of current environmental laws or new information about the extent of remediation required, could require us to make additional expenditures, modify or curtail our operations and/or install additional pollution control equipment. It is possible that regulatory agencies may identify new chemicals of concern or enact new or more stringent clean-up standards for existing chemicals of concern. This could lead to expenditures for environmental remediation in the future that are additional to existing estimates.

Accordingly, it is possible that some of the matters in which we are involved or may become involved may be resolved unfavorably to us, which could materially and adversely affect our business, financial position, cash flows or results of operations. See "Environmental Matters" contained in Item 7—"Management's Discussion and Analysis of Financial Condition and Results of Operations."

Lake City Contract Compliance and Deliverables—Various risks associated with our Lake City contract and performance under other government contracts could adversely affect our business, financial condition and results of operations.

Our Winchester business currently operates and manages the Lake City Army Ammunition Plant in Independence, MO under a seven year contract with the United States Army. Additionally, our Winchester business is engaged to perform various deliverables under other government contract arrangements. The Lake City facility also allows, under certain conditions, for Winchester to utilize the facility to produce commercial ammunition. The operation of the Lake City facility and our other U.S. government contracts require compliance with numerous contract provisions and government regulations. U.S. government contracts often reserve the right to audit our contract costs and conduct inquiries and investigations of our business practices and compliance with government contract requirements. Our failure to comply with any one of these contract provisions and regulations could have a material adverse impact on our business, financial position, and results of operations.

A large portion of our government contracts contain fixed-price deliverables while a smaller portion are performed under cost-plus arrangements. While certain of these contracts contain price escalation and other price adjustment provisions, if we are unable to control costs related to these contracts or if our assumptions regarding the fixed pricing on one or multiple of these contracts is incorrect, we may experience additional unrecovered costs and lower profitability.

Labor Matters—We cannot assure that we can conclude future labor contracts or any other labor agreements without work stoppages.

Various labor unions represent a significant number of our hourly paid employees for collective bargaining purposes. The following labor contract will be required to be negotiated in 2021:

Location	*Number of Employees*	*Expiration Date*
East Alton (Winchester)	573	December 2021

While we believe our relations with our employees and their various representatives are generally satisfactory, we cannot assure that we can conclude any labor agreements without work stoppages and cannot assure that any work stoppages will not have a material adverse effect on our business, financial condition or results of operations.

Item 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

Item 2. PROPERTIES

Information concerning our principal locations from which our products and services are manufactured, distributed or marketed are included in the tables set forth under the caption "Products and Services" contained in Item 1—"Business." Generally, these facilities are well maintained, in good operating condition, and suitable and adequate for their use. Our two largest facilities are co-located with a site partner. The land on which these facilities are located is leased with a 99-year initial term that commenced in 2015. Additionally, we lease warehouses, terminals and distribution offices and space for executive and branch sales offices and service departments. We believe our current facilities are adequate to meet the requirements of our present operations.

On October 1, 2020, Winchester assumed full management and operational control of the Lake City Army Ammunition Plant in Independence, MO, which is a government-owned, contractor operated facility. The United States Army selected Winchester to operate and manage Lake City in September 2019. The contract is for the production of small caliber military ammunition, including 5.56mm, 7.62mm, and .50 caliber rounds, as well as certain cartridges and casings. The contract also allows for the production of certain ammunition for commercial customers. The contract has an initial term of seven years and may be extended by the United States Army for up to three additional years.

Item 3. LEGAL PROCEEDINGS

Discussion of legal matters is incorporated by reference from Part II, Item 8, under the heading of "Legal Matters" within Note 23, "Commitments and Contingencies," and should be considered an integral part of Part I, Item 3, "Legal Proceedings."

Item 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

Item 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

As of January 31, 2021, we had 3,400 record holders of our common stock.

Our common stock is traded on the NYSE under the "OLN" ticker symbol.

A dividend of $0.20 per common share was paid during each of the four quarters in 2020 and 2019.

Issuer Purchases of Equity Securities

Period	*Total Number of Shares (or Units) Purchased*[(1)]	*Average Price Paid per Share (or Unit)*	*Total Number of Shares (or Units) Purchased as Part of Publicly Announced Plans or Programs*	*Maximum Dollar Value of Shares (or Units) that May Yet Be Purchased Under the Plans or Programs*
October 1-31, 2020	—	$ —	—	
November 1-30, 2020	—	—	—	
December 1-31, 2020	—	—	—	
Total				$ 304,075,829 (1)

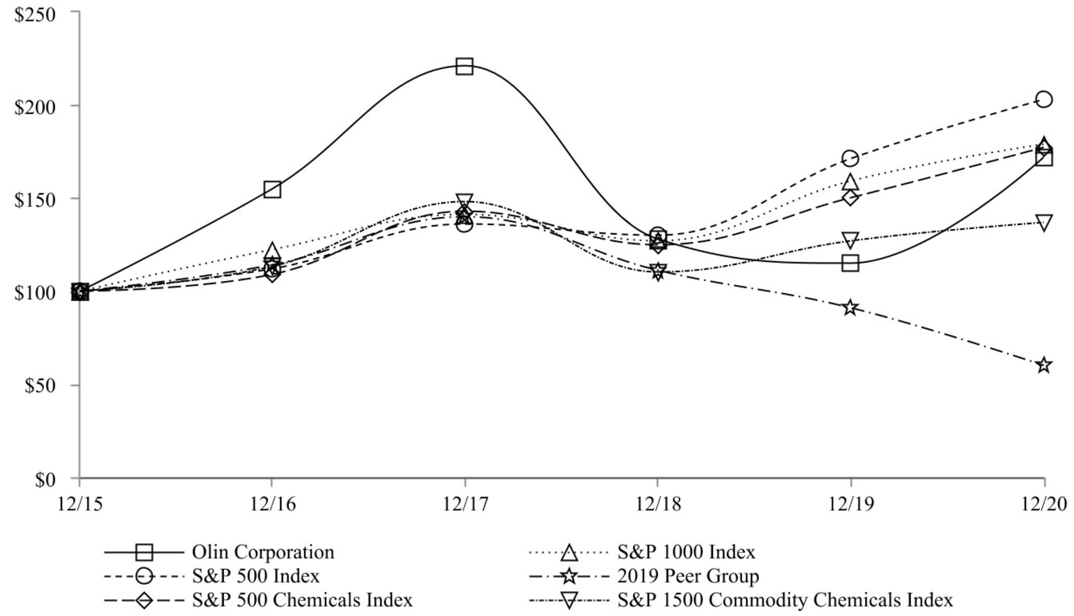
(1) On April 26, 2018, our board of directors authorized a share repurchase program for the purchase of shares of common stock at an aggregate price of up to $500.0 million. This program will terminate upon the purchase of $500.0 million of our common stock. Through December 31, 2020, 10,072,741 shares had been repurchased at a total value of $195,924,171 and $304,075,829 of common stock remained available for purchase under the program.

Performance Graph

This graph compares the total shareholder return on our common stock with the cumulative total return of the Standard & Poor's (S&P) 1000 Index (the S&P 1000 Index), S&P 500 Index, S&P 500 Chemicals Index, S&P Composite 1500 Commodity Chemicals Index (S&P 1500 Commodity Chemicals Index) and our peer group of four companies comprised of: Huntsman, Trinseo S.A., Oxy and Westlake (collectively, the 2019 Peer Group). We believe the S&P 500 Index is a better representation of overall market performance as compared to the S&P 1000 Index based on available market data. We adjusted our peer group to the S&P 500 Chemicals Index and S&P 1500 Commodity Chemicals Index to reflect a larger portfolio of companies that are in our current line of business and which we believe provide a better and more accurate basis to compare to our performance.

COMPARISON OF FIVE YEAR CUMULATIVE TOTAL RETURN

Among Olin Corporation, the S&P 1000 Index, the S&P 500 Index, the 2019 Peer Group, the S&P 500 Chemicals Index and the S&P 1500 Commodity Chemicals Index



	12/15	12/16	12/17	12/18	12/19	12/20
Olin Corporation	100	155	221	128	115	172
S&P 1000 Index	100	122	141	127	159	179
S&P 500 Index	100	112	136	130	171	203
2019 Peer Group	100	114	140	111	91	60
S&P 500 Chemicals Index	100	109	143	125	150	177
S&P 1500 Commodity Chemicals Index	100	113	148	110	127	137

Data is for the five-year period from December 31, 2015 through December 31, 2020. The cumulative return includes reinvestment of dividends. The 2019 Peer Group is weighted in accordance with market capitalization (closing stock price multiplied by the number of shares outstanding) as of the beginning of each of the five years covered by the performance graph. We calculated the weighted return for each year by multiplying (a) the percentage that each corporation's market capitalization represented of the total market capitalization for all corporations in the 2019 Peer Group for such year by (b) the total shareholder return for that corporation for such year.

Item 6. SELECTED FINANCIAL DATA

FIVE-YEAR SUMMARY

	2020	2019	2018	2017	2016
Operations	($ and shares in millions, except per share data)				
Sales	$ 5,758	$ 6,110	$ 6,946	$ 6,268	$ 5,551
Cost of goods sold	5,375	5,439	5,822	5,555	4,945
Selling and administration	422	417	431	369	347
Restructuring charges	9	76	22	38	113
Acquisition-related costs	—	—	1	13	49
Goodwill impairment	700	—	—	—	—
Other operating income	1	—	6	3	11
Earnings (losses) of non-consolidated affiliates	—	—	(20)	2	2
Interest expense	293	243	243	217	192
Interest income and other income	1	12	2	2	3
Non-operating pension income	19	16	22	34	45
Income (loss) before taxes	(1,020)	(37)	437	117	(34)
Income tax (benefit) provision	(50)	(26)	109	(432)	(30)
Net (loss) income	$ (970)	$ (11)	$ 328	$ 549	$ (4)
Financial position					
Cash and cash equivalents	$ 190	$ 221	$ 179	$ 218	$ 185
Working capital, excluding cash and cash equivalents	329	411	410	527	439
Property, plant and equipment, net	3,171	3,324	3,482	3,576	3,705
Total assets	8,271	9,188	8,997	9,218	8,763
Capitalization:					
Short-term debt	26	2	126	1	81
Long-term debt	3,838	3,339	3,104	3,611	3,537
Shareholders' equity	1,451	2,418	2,832	2,754	2,273
Total capitalization	$ 5,315	$ 5,759	$ 6,062	$ 6,366	$ 5,891
Per share data					
Net (loss) income:					
Basic	$ (6.14)	$ (0.07)	$ 1.97	$ 3.31	$ (0.02)
Diluted	$ (6.14)	$ (0.07)	$ 1.95	$ 3.26	$ (0.02)
Common cash dividends	$ 0.80	$ 0.80	$ 0.80	$ 0.80	$ 0.80
Other					
Capital expenditures	$ 299	$ 386	$ 385	$ 294	$ 278
Depreciation and amortization	568	597	601	559	534
Common dividends paid	126	129	134	133	132
Repurchases of common stock	—	146	50	—	—
Current ratio	1.4	1.6	1.5	1.8	1.7
Total debt to total capitalization	72.7 %	58.0 %	53.3 %	56.7 %	61.4 %
Effective tax rate	4.9 %	69.4 %	25.0 %	(368.9)%	88.6 %
Average common shares outstanding - diluted	157.9	162.3	168.4	168.5	165.2
Shareholders	3,400	3,500	3,700	3,900	4,200
Employees[(1)]	8,000	6,500	6,500	6,400	6,400

(1) As of December 31, 2020, employees includes approximately 1,700 employees at Lake City which is a government-owned, contractor-operated facility.

Item 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

BUSINESS BACKGROUND

We are a leading vertically-integrated global manufacturer and distributor of chemical products and a leading U.S. manufacturer of ammunition. Our operations are concentrated in three business segments: Chlor Alkali Products and Vinyls, Epoxy and Winchester. All of our business segments are capital intensive manufacturing businesses. Chlor Alkali Products and Vinyls operating rates are closely tied to the general economy. Each segment has a commodity element to it.

Our Chlor Alkali Products and Vinyls segment is partially a commodity business where all supplier products are similar and price is the major supplier selection criterion. Pricing for these products is subject to a variety of factors, some of which are outside of our control. Our Chlor Alkali Products and Vinyls segment produces some of the most widely used chemicals in the world that can be upgraded into a wide variety of downstream chemical products used in many end-markets. Changes in supply/demand, can be abrupt and significant and, given capacity in our Chlor Alkali Products and Vinyls segment, can lead to significant changes in our overall profitability.

The Epoxy segment consumes some products manufactured by the Chlor Alkali Products and Vinyls segment. The Epoxy segment's upstream and midstream products are partially commodity markets. Pricing for these products is subject to a variety of factors, some of which are outside of our control. While competitive differentiation exists through downstream customization and product development opportunities, pricing is extremely competitive with a broad range of competitors across the globe.

Winchester also has a commodity element to its business, but a majority of Winchester ammunition is sold as a branded consumer product where there are opportunities to differentiate certain offerings through innovative new product development and enhanced product performance. While competitive pricing versus other branded ammunition products is important, it is not the only factor in product selection.

RECENT DEVELOPMENTS AND HIGHLIGHTS

COVID-19

The 2019 Novel Coronavirus (COVID-19) global pandemic, and the various governmental, business and consumer responses to this pandemic, significantly impacted our results during 2020. We have taken measures to protect the health and safety of our employees, work with our customers and suppliers to minimize potential disruptions and support our communities during this global pandemic. Our operations are among businesses that have been considered "essential" by government and public health authorities. We are following all federal, state and local health department guidelines and the costs associated with these safety procedures were not material. We continue to safely maintain plant operations and focus on business continuity. All Olin manufacturing facilities worldwide continue to operate, with the exception of those undergoing planned maintenance turnarounds.

The spread of the pandemic and the associated response has caused significant disruptions in the U.S. and global economies, resulting in the disruption of the supply and demand fundamentals of our Chemicals businesses. The various governmental, business and consumer responses to the pandemic negatively impacted the demand for several of the products produced by our Chlor Alkali Products and Vinyls and Epoxy businesses resulting in lower volumes and pricing. We are monitoring the changing business environment, volatility and heightened degree of uncertainty resulting from the response to COVID-19. At the current time, we are unable to fully determine its future impact on our business. We continue to work with our customers, employees, suppliers and communities to address the impacts of COVID-19 and we continue to assess possible implications to our business, supply chain and customers, and to take actions in an effort to mitigate adverse consequences.

We have initiated several on-going actions that we believe will partially mitigate the impact of economic decline on our financial performance, but also enhance our position, financially and structurally, to take advantage of the eventual global economic recovery. Several of these actions and our liquidity resources are summarized below:

- In May 2020, we entered into a $1,300.0 million senior secured credit facility (Senior Secured Credit Facility) that amended our existing senior credit facility, which provides additional flexibility under our restrictive compliance covenants. The facility includes a $800.0 million senior secured revolving credit facility, of which we have $799.6 million available to us at December 31, 2020, and a $500.0 million senior secured delayed-draw term loan facility which was fully drawn in October 2020 and used to call a portion of the 9.75% senior notes due 2023.

- In May 2020, we issued $500.0 million 9.50% senior notes due 2025 (2025 Notes). Proceeds from the 2025 Notes provided additional liquidity and were used for general corporate purposes.
- During 2020, we amended our Receivables Financing Agreement to expand the borrowing capacity to $250.0 million and had outstanding borrowings of $125.0 million as of December 31, 2020. We also have the ability to increase our accounts receivable factoring arrangements, which ultimately can accelerate the timing of cash receipts and enhance our cash position. The Receivables Financing Agreement and accounts receivable factoring arrangements do not impact our Senior Secured Credit Facility debt ratio covenants.
- We executed a strategy to improve our working capital and manage our balance sheet to maximize our financial flexibility. During 2020, Olin reduced working capital by approximately $142 million, which included an approximately $67 million investment in working capital to support Lake City operations.
- During 2020, our capital expenditures were approximately $87 million lower than 2019 and we are forecasting capital spending to be in the $200 million range in 2021, which would be an additional $100 million lower than 2020 levels.
- As part of our ongoing productivity initiatives to reduce operating costs, during 2020, we reduced overall employee and contractor headcount in our chemicals businesses and corporate functions.
- During 2020, we suspended the defined contribution plan match on all salaried and non-bargaining hourly employees' contributions.
- We believe that we have access to both the high-yield debt and equity markets at this time.

We still believe there is a high degree of economic uncertainty in the global markets in which we participate and we believe the steps we have taken and will continue to take to enhance our capital structure and liquidity have strengthened our ability to operate through the current conditions.

2020 Overview

Net loss was $969.9 million for the year ended December 31, 2020 compared to net loss of $11.3 million for 2019. The decrease in results from the prior year was primarily due to a goodwill impairment charge of $699.8 million and lower Chlor Alkali Products and Vinyls segment results, primarily due to lower pricing and volumes. Partially offsetting these declines were higher Winchester segment results.

Chlor Alkali Products and Vinyls generated segment income of $3.5 million for 2020 compared to $336.7 million for 2019. Chlor Alkali Products and Vinyls segment results were lower than in the prior year primarily due to lower pricing, primarily caustic soda and ethylene dichloride (EDC), and lower volumes, primarily caustic soda. These decreases were partially offset by lower costs, including raw materials and operating costs. Chlor Alkali Products and Vinyls segment results included depreciation and amortization expense of $451.4 million and $470.4 million in 2020 and 2019, respectively.

Epoxy reported segment income of $40.8 million for 2020 compared to $53.9 million for 2019. Epoxy segment results were lower than in the prior year primarily due to lower product prices, partially offset by lower raw material costs. Epoxy segment results included depreciation and amortization expense of $90.7 million and $100.1 million in 2020 and 2019, respectively.

On October 1, 2020, Winchester assumed full management and operational control of the Lake City facility in Independence, MO. The U.S. Army selected Winchester to operate and manage the Lake City facility in September 2019. The contract has an initial term of seven years and may be extended by the U.S. Army for up to three additional years.

Winchester reported segment income of $92.3 million for 2020 compared to $40.1 million for 2019. The increase in segment results was due to increased sales volumes, which includes ammunition produced at Lake City, and higher product pricing, partially offset by transition costs relating to the Lake City contract and higher operating costs. Winchester segment results included depreciation and amortization expense of $20.1 million in both 2020 and 2019.

On October 15, 2020, Olin redeemed $600.0 million of the outstanding 9.75% senior notes due 2023 (2023 Notes). The 2023 Notes were redeemed at 102.438% of the principal amount of the 2023 Notes, resulting in a redemption premium of $14.6 million. The 2023 Notes were redeemed by drawing on our $500.0 million senior secured delayed-draw term loan facility (Delayed Draw Term Loan Facility) along with utilizing $114.6 million of cash on hand.

Subsequent Event

On January 15, 2021, Olin redeemed the remaining $120.0 million of the outstanding 2023 Notes. The 2023 Notes were redeemed at 102.438% of the principal amount of the 2023 Notes, resulting in a redemption premium of $2.9 million. The remaining 2023 Notes were redeemed by utilizing $122.9 million of cash on hand.

CONSOLIDATED RESULTS OF OPERATIONS

	Years ended December 31,		
	2020	2019	2018
	($ in millions, except per share data)		
Sales	$ 5,758.0	$ 6,110.0	$ 6,946.1
Cost of goods sold	5,374.6	5,439.2	5,822.1
Gross margin	383.4	670.8	1,124.0
Selling and administration	422.0	416.9	430.6
Restructuring charges	9.0	76.5	21.9
Acquisition-related costs	—	—	1.0
Goodwill impairment	699.8	—	—
Other operating income	0.7	0.4	6.4
Operating (loss) income	(746.7)	177.8	676.9
Losses of non-consolidated affiliates	—	—	(19.7)
Interest expense	292.7	243.2	243.2
Interest income	0.5	1.0	1.6
Non-operating pension income	18.9	16.3	21.7
Other income	—	11.2	—
Income (loss) before taxes	(1,020.0)	(36.9)	437.3
Income tax (benefit) provision	(50.1)	(25.6)	109.4
Net (loss) income	$ (969.9)	$ (11.3)	$ 327.9
Net (loss) income per common share:			
Basic	$ (6.14)	$ (0.07)	$ 1.97
Diluted	$ (6.14)	$ (0.07)	$ 1.95

2020 Compared to 2019

Sales for 2020 were $5,758.0 million compared to $6,110.0 million in 2019, a decrease of $352.0 million, or 6%. Chlor Alkali Products and Vinyls sales decreased by $460.2 million, primarily due to lower caustic soda and EDC pricing and lower volumes, primarily caustic soda. Epoxy sales decreased by $153.9 million, primarily due to lower product prices. Winchester sales increased by $262.1 million, primarily due to higher commercial and military sales volumes, which included ammunition produced at Lake City, and increased commercial ammunition pricing.

Gross margin decreased $287.4 million, or 43%, from 2019. Chlor Alkali Products and Vinyls gross margin decreased by $327.2 million, primarily due to lower caustic soda and EDC pricing and lower volumes, partially offset by lower costs, primarily raw materials. Epoxy gross margin decreased $9.5 million, primarily due to lower product prices, partially offset by lower raw material costs. Winchester gross margin increased $73.5 million, primarily due to higher sales volumes, which included ammunition produced at Lake City, and increased commercial pricing. Gross margin as a percentage of sales decreased to 7% in 2020 from 11% in 2019.

Selling and administration expenses in 2020 increased $5.1 million, or 1%, from 2019. The increase was primarily due to Lake City operations and higher transition costs relating to the Lake City contract of $22.4 million and higher stock-based compensation expense of $14.7 million, which includes mark-to-market adjustments. These increases were partially offset by lower salaries and benefits of $13.9 million, consulting and contract services of $7.9 million and travel-related expenses of $8.1 million. In 2017, we began a multi-year implementation of new enterprise resource planning, manufacturing and engineering systems, and related infrastructure (collectively, the Information Technology Project). Selling and administration expenses for the years ended December 31, 2020 and 2019 included costs associated with the Information Technology Project of $73.9 million and $77.0 million, respectively. Selling and administration expenses as a percentage of sales were 7% in both 2020 and 2019.

Restructuring charges in 2020 and 2019 were primarily associated with the March 2016 closure of 433,000 tons of chlor alkali capacity across three separate locations. Restructuring charges for the years ended December 31, 2020 and 2019 were also associated with the closure of a chlor alkali plant and a VDC production facility, both in Freeport, TX, and included $58.9

million of non-cash impairment charges for equipment and facilities for the year ended December 31, 2019. Restructuring charges for the year ended December 31, 2019 also included costs associated with permanently closing the ammunition assembly operations at our Geelong, Australia facility in December 2018.

Goodwill impairment includes non-cash pretax impairment charges of $557.6 million related to the Chlor Alkali Products and Vinyls segment and $142.2 million related to the Epoxy segment.

Interest expense increased by $49.5 million for the year ended December 31, 2020, primarily due to a higher level of debt outstanding and higher interest rates. Interest expense included $14.6 million of expense related to the 2023 Notes redemption premium and $5.8 million for write-off of deferred debt issuance costs for financing transactions during 2020. Interest expense for the years ended December 31, 2020 and 2019 included $4.0 million and $17.0 million, respectively, of accretion expense related to the ethylene payment discount. Interest expense was reduced by capitalized interest of $6.4 million and $10.8 million for 2020 and 2019, respectively.

Non-operating pension income includes all components of pension and other postretirement income (costs) other than service costs. Non-operating pension income was higher for the year ended December 31, 2020, primarily due to a decrease in the amortization of actuarial losses associated with our domestic qualified defined benefit pension plan.

The effective tax rate for 2020 included expenses associated with a net increase in the valuation allowance related to foreign and domestic tax credits and deferred tax assets in foreign jurisdictions, a remeasurement of deferred taxes due to an increase in our state effective tax rates and a change in tax contingencies, and stock-based compensation, partially offset by a benefit associated with prior year tax positions. These factors resulted in a net $27.9 million tax expense. For 2020, a tax benefit of $10.8 million was recognized associated with the $699.8 million goodwill impairment charge. After giving consideration to these items, including the goodwill impairment charge on Olin’s loss before taxes, the effective tax rate for 2020 of 21.0% was equal to the 21% U.S. federal statutory rate as foreign income taxes, foreign income inclusions and a net increase in the valuation allowance related to losses in foreign jurisdictions were offset by state taxes and favorable permanent salt depletion deductions. The effective tax rate for 2019 included benefits associated with the finalization of the Internal Revenue Service (IRS) review of years 2013 to 2015 U.S. income tax claims, stock-based compensation, prior year tax positions, foreign tax law changes, a remeasurement of deferred taxes due to a decrease in our state effective tax rates and a change in tax contingencies. The effective tax rate also included expenses associated with a net increase in the valuation allowance primarily related to foreign deferred tax assets and liabilities. These factors resulted in a net $19.4 million tax benefit. After giving consideration to these items, the effective tax rate for 2019 of 16.8% was lower than the 21% U.S. federal statutory rate primarily due to state taxes and a net increase in the valuation allowance related to losses in foreign jurisdictions, partially offset by foreign income taxes and favorable permanent salt depletion deductions.

2019 Compared to 2018

Sales for 2019 were $6,110.0 million compared to $6,946.1 million in 2018, a decrease of $836.1 million, or 12%. Chlor Alkali Products and Vinyls sales decreased by $566.6 million primarily due to lower caustic soda pricing. Epoxy sales decreased by $278.7 million primarily due to lower product prices and an unfavorable effect of foreign currency translation. Winchester sales increased by $9.2 million primarily due to higher ammunition sales to commercial customers.

Gross margin decreased $453.2 million, or 40%, from 2018. Chlor Alkali Products and Vinyls gross margin decreased by $342.1 million, primarily due to lower caustic soda pricing, partially offset by lower raw material and operating costs. Epoxy gross margin decreased $20.6 million primarily due to lower product prices, partially offset by lower raw material costs, primarily benzene and propylene, and lower maintenance and unabsorbed fixed manufacturing costs associated with maintenance turnarounds. Winchester gross margin increased $1.2 million primarily due to lower costs, partially offset by lower product prices. Gross margin in 2018 was positively impacted by insurance recoveries for environmental costs incurred and expensed in prior periods of $111.0 million. Gross margin as a percentage of sales decreased to 11% in 2019 from 16% in 2018.

Selling and administration expenses in 2019 decreased $13.7 million, or 3%, from 2018. The years ended December 31, 2019 and 2018 included costs associated with the Information Technology Project of $77.0 million and $36.5 million, respectively, an increase of $40.5 million. More than offsetting this increase were lower legal and legal-related settlement expenses of $19.3 million, primarily due to the legal fees associated with the environmental recovery actions in 2018, lower consulting and contract services of $13.7 million, lower management incentive compensation expense of $10.2 million, which includes mark-to-market adjustments on stock-based compensation expense, and a favorable foreign currency impact of $8.5 million. Selling and administration expenses as a percentage of sales were 7% in 2019 and 6% in 2018.

Restructuring charges in 2019 included $58.9 million of non-cash impairment charges for equipment and facilities associated with the closure of a chlor alkali plant and a VDC production facility, both in Freeport, TX. Restructuring charges in 2019 and 2018 were also associated with the March 2016 closure of 433,000 tons of chlor alkali capacity across three separate locations and the December 2018 decision to permanently close the ammunition assembly operations at our Winchester facility in Geelong, Australia.

Other operating income for the year ended December 31, 2018 included an $8.0 million insurance recovery for a second quarter 2017 business interruption at our Freeport, TX vinyl chloride monomer facility partially offset by a $1.7 million loss on the sale of land.

Losses of non-consolidated affiliates for the year ended December 31, 2018 reflect a $21.5 million non-cash impairment charge.

Interest expense for the year ended December 31, 2019 was impacted by a lower level of average debt outstanding partially offset by higher interest rates compared to the year ended December 31, 2018. Interest expense for the years ended December 31, 2019 and 2018 included $17.0 million and $16.0 million, respectively, of accretion expense related to the ethylene payment discount. Interest expense was reduced by capitalized interest of $10.8 million and $6.0 million for 2019 and 2018, respectively.

Non-operating pension income includes all components of pension and other postretirement income (costs) other than service costs. Non-operating pension income was lower for the year ended December 31, 2019, primarily due to an increase in Pension Benefit Guaranty Corporation fees associated with our domestic qualified defined benefit pension plan.

The effective tax rate for 2019 included benefits associated with the finalization of the IRS review of years 2013 to 2015 U.S. income tax claims, stock-based compensation, prior year tax positions, foreign tax law changes, a remeasurement of deferred taxes due to a decrease in our state effective tax rates and a change in tax contingencies. The effective tax rate also included expenses associated with a net increase in the valuation allowance primarily related to foreign deferred tax assets and liabilities. These factors resulted in a net $19.4 million tax benefit. After giving consideration to these items, the effective tax rate for 2019 of 16.8% was lower than the 21% U.S. federal statutory rate primarily due to state taxes and a net increase in the valuation allowance related to losses in foreign jurisdictions, partially offset by foreign income taxes and favorable permanent salt depletion deductions. The effective tax rate for 2018 included benefits associated with the U.S. Tax Cuts & Jobs Act (2017 Tax Act), stock-based compensation, changes in tax contingencies, a foreign dividend payment, changes associated with prior year tax positions and the remeasurement of deferred taxes due to a decrease in our state effective tax rates. The effective tax rate also included expenses associated with a net increase in the valuation allowance related to deferred tax assets in foreign jurisdictions and the remeasurement of deferred taxes due to changes in our foreign tax rates. These factors resulted in a net $2.9 million tax benefit, of which $3.8 million related to the increase of the 2017 Tax Act benefit. After giving consideration to these items, the effective tax rate for 2018 of 25.7% was higher than the 21% U.S. federal statutory rate primarily due to state and foreign income taxes, foreign income inclusions and a net increase in the valuation allowance related to current year losses in foreign jurisdictions, partially offset by favorable permanent salt depletion deductions.

SEGMENT RESULTS

We define segment results as income (loss) before interest expense, interest income, goodwill impairment charges, other operating income (expense), non-operating pension income, other income and income taxes, and includes the operating results of non-consolidated affiliates. Consistent with the guidance in ASC 280 "Segment Reporting," we have determined it is appropriate to include the operating results of non-consolidated affiliates in the relevant segment financial results. We have three operating segments: Chlor Alkali Products and Vinyls, Epoxy and Winchester. The three operating segments reflect the organization used by our management for purposes of allocating resources and assessing performance. Chlorine used in our Epoxy segment is transferred at cost from the Chlor Alkali Products and Vinyls segment. Sales and profits are recognized in the Chlor Alkali Products and Vinyls segment for all caustic soda generated and sold by Olin.

	Years ended December 31,		
	2020	2019	2018
	($ in millions)		
Sales:			
Chlor Alkali Products and Vinyls	$ 2,959.9	$ 3,420.1	$ 3,986.7
Epoxy	1,870.5	2,024.4	2,303.1
Winchester	927.6	665.5	656.3
Total sales	$ 5,758.0	$ 6,110.0	$ 6,946.1
Income (loss) before taxes:			
Chlor Alkali Products and Vinyls(1)	$ 3.5	$ 336.7	$ 637.1
Epoxy	40.8	53.9	52.8
Winchester	92.3	40.1	38.4
Corporate/Other:			
Environmental (expense) income (2)	(20.9)	(20.5)	103.7
Other corporate and unallocated costs(3)	(154.3)	(156.3)	(158.3)
Restructuring charges(4)	(9.0)	(76.5)	(21.9)
Acquisition-related costs	—	—	(1.0)
Goodwill impairment	(699.8)	—	—
Other operating income(5)	0.7	0.4	6.4
Interest expense(6)	(292.7)	(243.2)	(243.2)
Interest income	0.5	1.0	1.6
Non-operating pension income	18.9	16.3	21.7
Other income(7)	—	11.2	—
Income (loss) before taxes	$ (1,020.0)	$ (36.9)	$ 437.3

(1) Losses of non-consolidated affiliates are included in the Chlor Alkali Products and Vinyls segment results consistent with management's monitoring of the operating segment. The losses of non-consolidated affiliates were $19.7 million for the year ended December 31, 2018, which reflected a $21.5 million non-cash impairment charge.

(2) Environmental (expense) income for the year ended December 31, 2019 included $4.8 million of an environmental insurance-related settlement gain. Environmental (expense) income for the year ended December 31, 2018 included pre-tax insurance recoveries for environmental costs incurred and expensed in prior periods of $111.0 million. Environmental (expense) income is included in cost of goods sold in the consolidated statements of operations.

(3) Other corporate and unallocated costs for the years ended December 31, 2020, 2019 and 2018 included costs associated with the implementation of the Information Technology Project of $73.9 million, $77.0 million and $36.5 million, respectively.

(4) Restructuring charges for the years ended December 31, 2020, 2019 and 2018 included costs associated with the March 2016 closure of 433,000 tons of chlor alkali capacity across three separate locations. Restructuring charges for the years ended December 31, 2020 and 2019 were also associated with the closure of a chlor alkali plant and a VDC production facility, both in Freeport, TX, and included $58.9 million of non-cash impairment charges for equipment and facilities for the year ended December 31, 2019. Restructuring charges for the years ended December 31, 2019 and 2018 also

included costs associated with permanently closing the ammunition assembly operations at our Geelong, Australia facility in December 2018. Restructuring charges for the year ended December 31, 2018 also included charges associated with permanently closing a portion of the Becancour, Canada chlor alkali facility in 2014.

(5) Other operating income for the year ended December 31, 2020 included an $0.8 million gain on the sale of land. Other operating income for the year ended December 31, 2018 included an $8.0 million insurance recovery for a second quarter 2017 business interruption at our Freeport, TX vinyl chloride monomer facility partially offset by a $1.7 million loss on the sale of land.

(6) Interest expense for the year ended December 31, 2020 included $14.6 million of expense related to the 2023 Notes redemption premium and $5.8 million for the write-off of deferred debt issuance costs associated with financing transactions during 2020. Interest expense for the years ended December 31, 2020, 2019 and 2018 included $4.0 million, $17.0 million and $16.0 million, respectively, of accretion expense related to the ethylene payment discount. Interest expense was reduced by capitalized interest of $6.4 million, $10.8 million and $6.0 million for the years ended December 31, 2020, 2019 and 2018, respectively.

(7) Other income for the year ended December 31, 2019 included a gain of $11.2 million on the sale of our equity interest in a non-consolidated affiliate.

Chlor Alkali Products and Vinyls

2020 Compared to 2019

Chlor Alkali Products and Vinyls sales for 2020 were $2,959.9 million compared to $3,420.1 million for 2019, a decrease of $460.2 million, or 13%. The sales decrease was primarily due to lower caustic soda and EDC pricing and lower volumes, primarily caustic soda.

Chlor Alkali Products and Vinyls generated segment income of $3.5 million for 2020 compared to $336.7 million for 2019, a decrease of $333.2 million. The decrease in Chlor Alkali Products and Vinyls segment results was primarily due to lower product prices ($318.5 million), primarily caustic soda and EDC, and lower volumes ($143.1 million), primarily caustic soda. Partially offsetting these decreases were lower raw material costs ($83.8 million) and lower maintenance turnaround and operating costs ($44.6 million). Chlor Alkali Products and Vinyls segment results included depreciation and amortization expense of $451.4 million and $470.4 million in 2020 and 2019, respectively.

2019 Compared to 2018

Chlor Alkali Products and Vinyls sales for 2019 were $3,420.1 million compared to $3,986.7 million for 2018, a decrease of $566.6 million, or 14%. The sales decrease was primarily due to lower product pricing, primarily caustic soda, and lower volumes.

Chlor Alkali Products and Vinyls generated segment income of $336.7 million for 2019 compared to $637.1 million for 2018, a decrease of $300.4 million, or 47%. The decrease in Chlor Alkali Products and Vinyls segment results was primarily due to lower product prices ($449.4 million), primarily caustic soda, and lower volumes ($53.0 million), partially offset by lower raw material and operating costs ($138.1 million) and lower maintenance turnaround costs ($42.4 million). Chlor Alkali Products and Vinyls 2018 segment results were also negatively impacted by a non-cash impairment charge associated with our investment in a non-consolidated affiliate ($21.5 million). Chlor Alkali Products and Vinyls segment results included depreciation and amortization expense of $470.4 million and $473.1 million in 2019 and 2018, respectively.

Epoxy

2020 Compared to 2019

Epoxy sales were $1,870.5 million for 2020 compared to $2,024.4 million for 2019, a decrease of $153.9 million, or 8%. The sales decrease was primarily due to lower product prices ($180.0 million) and an unfavorable effect of foreign currency translation ($6.1 million), partially offset by higher volumes ($32.2 million).

Epoxy reported segment income of $40.8 million for 2020 compared to $53.9 million for 2019, a decrease of $13.1 million, or 24%. The decrease in segment results was primarily due to lower product prices ($180.0 million) and an unfavorable product mix ($24.4 million), partially offset by lower raw material costs ($162.5 million), primarily benzene and propylene, and lower operating costs ($38.8 million). Epoxy segment results were also negatively affected by a first quarter 2020 force majeure declaration by a European phenol supplier, which reduced epoxy resin and epoxy resin precursor production, and Epoxy manufacturing plant closures and operating reductions in Asia due to COVID-19 ($10.0 million). A significant percentage of our Euro denominated sales are of products manufactured within Europe. As a result, the impact of foreign currency translation on revenue is primarily offset by the impact of foreign currency translation on raw materials and manufacturing costs also denominated in Euros. Epoxy segment results included depreciation and amortization expense of $90.7 million and $100.1 million in 2020 and 2019, respectively.

2019 Compared to 2018

Epoxy sales were $2,024.4 million for 2019 compared to $2,303.1 million for 2018, a decrease of $278.7 million, or 12%. The sales decrease was primarily due to lower product prices ($258.9 million) and an unfavorable effect of foreign currency translation ($62.5 million), partially offset by increased volumes ($42.7 million).

Epoxy reported segment income of $53.9 million for 2019 compared to $52.8 million for 2018, an increase of $1.1 million, or 2%. The increase in segment results was primarily due to lower maintenance costs and unabsorbed fixed manufacturing costs associated with maintenance turnarounds ($40.0 million), decreased operating costs ($18.1 million) and lower raw material costs ($214.1 million), primarily benzene and propylene, partially offset by lower product prices ($258.9 million) and an unfavorable product mix ($12.2 million). A significant percentage of our Euro denominated sales are of products manufactured within Europe. As a result, the impact of foreign currency translation on revenue is primarily offset by the impact of foreign currency translation on raw materials and manufacturing costs also denominated in Euros. Epoxy segment results included depreciation and amortization expense of $100.1 million and $102.4 million in 2019 and 2018, respectively.

Winchester

2020 Compared to 2019

Winchester sales were $927.6 million for 2020 compared to $665.5 million for 2019, an increase of $262.1 million, or 39%. The increase was due to higher ammunition sales to commercial customers ($199.2 million) and military customers ($51.9 million), both of which include ammunition produced at Lake City, and law enforcement agencies ($11.0 million).

Winchester reported segment income of $92.3 million for 2020 compared to $40.1 million for 2019, an increase of $52.2 million, or 130%. The increase in segment results was due to increased sales volumes ($49.2 million), which includes ammunition produced at Lake City, and higher product pricing ($23.4 million), partially offset by higher transition costs relating to the Lake City contract ($12.9 million) and higher operating costs ($7.5 million). Winchester segment results included depreciation and amortization expense of $20.1 million in both 2020 and 2019.

2019 Compared to 2018

Winchester sales were $665.5 million for 2019 compared to $656.3 million for 2018, an increase of $9.2 million, or 1%. The sales increase was primarily due to higher ammunition sales to commercial customers ($13.7 million), partially offset by decreased sales to military customers and law enforcement agencies ($4.5 million).

Winchester reported segment income of $40.1 million for 2019 compared to $38.4 million for 2018, an increase of $1.7 million, or 4%. The increase in segment results was primarily due to lower costs ($8.7 million), primarily commodity and other material costs, partially offset by lower product prices ($6.6 million) and a less favorable product mix ($0.4 million). Winchester segment results included depreciation and amortization expense of $20.1 million and $20.0 million in 2019 and 2018, respectively.

Corporate/Other

2020 Compared to 2019

For the year ended December 31, 2020, charges to income for environmental investigatory and remedial activities were $20.9 million compared to $20.5 million for the year ended December 31, 2019. These charges related primarily to expected future investigatory and remedial activities associated with past manufacturing operations and former waste disposal sites. The year ended December 31, 2019 includes a $4.8 million environmental insurance-related settlement gain.

For 2020, other corporate and unallocated costs were $154.3 million compared to $156.3 million for 2019, a decrease of $2.0 million, or 1%. The decrease was primarily due to lower salary and benefit costs of $12.2 million and lower travel-related expenses of $2.1 million, partially offset by higher stock-based compensation expense of $14.8 million, which includes mark-to-market adjustments. Other corporate and unallocated costs included costs associated with the implementation of the Information Technology Project for the year ended December 31, 2020 and 2019 of $73.9 million and $77.0 million, respectively.

2019 Compared to 2018

For the year ended December 31, 2019, net charges to income for environmental investigatory and remedial activities were $20.5 million, which include $4.8 million of an environmental insurance-related settlement gain. For the year ended December 31, 2018, net credits to income for environmental investigatory and remedial activities were $103.7 million, which include $111.0 million of insurance recoveries for environmental costs incurred and expensed in prior periods. Without these recoveries, charges to income for environmental investigatory and remedial activities in 2019 and 2018 would have been $25.3 million and $7.3 million, respectively. The increase in environmental expense from the prior year primarily relates to a $20.0 million increase in costs at a former manufacturing site resulting from revised remediation estimates as a result of agency action. These charges related primarily to expected future investigatory and remedial activities associated with past manufacturing operations and former waste disposal sites.

For 2019, other corporate and unallocated costs were $156.3 million compared to $158.3 million for 2018, a decrease of $2.0 million, or 1%. The decrease was primarily due to lower legal and legal-related settlement expenses of $17.7 million, primarily due to the legal fees associated with the environmental recovery actions in 2018, decreased management incentive expense of $9.4 million, which includes mark-to-market adjustments on stock-based compensation expense, a favorable foreign currency impact of $8.2 million and lower consulting charges of $6.4 million. These decreases were partially offset by higher costs associated with the Information Technology Project of $40.5 million.

Restructurings

On December 11, 2019, we announced that we had made the decision to permanently close a chlor alkali plant with a capacity of 230,000 tons and our VDC production facility, both in Freeport, TX. The VDC facility was closed during the fourth quarter of 2020. The related chlor alkali plant closure is expected to be completed in the second quarter of 2021. For the year ended December 31, 2020, we recorded pretax restructuring charges of $3.8 million for facility exit costs and employee severance and related benefit costs related to these actions. For the year ended December 31, 2019, we recorded pretax restructuring charges of $58.9 million for facility exit costs and non-cash impairment of equipment and facilities related to these actions.

On December 10, 2018, we announced that we had made the decision to permanently close the ammunition assembly operations at our Winchester facility in Geelong, Australia. Subsequent to the facility's closure, products for customers in the region are sourced from Winchester manufacturing facilities located in the United States. For the years ended December 31, 2019 and 2018, we recorded pretax restructuring charges of $0.4 million and $4.1 million, respectively for the write-off of equipment and facility costs, employee severance and related benefit costs, lease and other contract termination costs and facility exit costs related to this action.

Subsequent Event

On January 18, 2021, we announced we had made the decision to permanently close our trichloroethylene and anhydrous hydrogen chloride liquefaction facilities in Freeport, TX, before the end of 2021. We expect to incur restructuring charges through 2023 of approximately $23 million related to these actions, approximately $2 million of which is expected to be incurred in 2021. These restructuring costs are expected to consist of $21 million of facility exit costs and $2 million of contract termination costs.

2021 OUTLOOK

In 2021, we expect to continue to implement and benefit from Olin's new operating model of optimizing value across our chemicals businesses. Olin drove sequential pricing improvement in the fourth quarter 2020 for chlorine and almost all chlorine derivatives, including epoxy resins. During 2021, we expect to deliver ECU pricing improvement compared to 2020, partially offset by lower volumes as we continue to selectively sell less into poor quality markets and remain disciplined in our approach to both sides of the ECU. In 2021, we expect year over year improvement in both Chlor Alkali Products and Vinyls and Epoxy segment results. During 2021, productivity efforts are also expected to result in lower operating costs across our chemical businesses.

Winchester 2021 segment income is expected to improve from 2020 segment income of $92.3 million due to higher commercial product pricing and increased sales volumes, which includes ammunition produced at Lake City. During 2020, Winchester segment results included transition costs related to the Lake City contract of $13.5 million.

Other Corporate and Unallocated costs in 2021 are expected to be lower than the $154.3 million in 2020, primarily due to 2020 results including $73.9 million of costs associated with the Information Technology Project. The Information Technology Project was substantially completed during 2020. Partially offsetting these lower costs in 2021 will be higher management incentive expense, including mark-to-market adjustments on stock-based compensation expense.

During 2021, we anticipate environmental expenses in the $20 million to $25 million range compared to $20.9 million in 2020.

We expect non-operating pension income in 2021 to be in the $30 million to $35 million range compared to $18.9 million in 2020. Based on our plan assumptions and estimates, we will not be required to make any cash contributions to our domestic qualified defined benefit pension plan in 2021. We have several international qualified defined benefit pension plans for which we anticipate cash contributions of less than $5 million in 2020.

In 2021, we currently expect our capital spending to be in the $200 million range, which would be approximately $100 million lower than 2020 levels. We expect 2021 depreciation and amortization expense to be in the $575 million to $600 million range.

We currently believe the 2021 effective tax rate will be in the 15% to 20% range, while we expect cash taxes will be in the range of $15 million, which primarily reflects the utilization of domestic tax loss carryforwards.

PENSION AND POSTRETIREMENT BENEFITS

Under ASC 715, we recorded an after-tax benefit of $14.8 million ($26.6 million pretax) to shareholders' equity as of December 31, 2020 for our pension and other postretirement plans. This benefit primarily reflected favorable performance on plan assets during 2020, partially offset by a 80-basis point decrease in the domestic pension plans' discount rate. In 2019, we recorded an after-tax charge of $150.2 million ($183.9 million pretax) to shareholders' equity as of December 31, 2019 for our pension and other postretirement plans. This charge primarily reflected a 100-basis point decrease in the domestic pension plans' discount rate, partially offset by favorable performance on plan assets during 2019. In 2018, we recorded an after-tax charge of $74.9 million ($98.5 million pretax) to shareholders' equity as of December 31, 2018 for our pension and other postretirement plans. This charge primarily reflected unfavorable performance on plan assets during 2018, partially offset by a 60-basis point increase in the domestic pension plans' discount rate. These non-cash charges to shareholders' equity do not affect our ability to borrow under our senior secured credit facility.

During 2019, we made a discretionary cash contribution to our domestic qualified defined benefit pension plan of $12.5 million. Based on our plan assumptions and estimates, we will not be required to make any cash contributions to the domestic qualified defined benefit pension plan at least through 2021.

In connection with international qualified defined benefit pension plans, we made cash contributions of $2.1 million, $2.4 million and $2.6 million in 2020, 2019 and 2018, respectively, and we anticipate less than $5 million of cash contributions to international qualified defined benefit pension plans in 2021.

At December 31, 2020, the projected benefit obligation of $3,199.4 million exceeded the market value of assets in our qualified defined benefit pension plans by $730.3 million, as calculated under ASC 715.

Components of net periodic benefit (income) costs were:

	Years ended December 31,		
	2020	***2019***	***2018***
		($ in millions)	
Pension benefits	$ (11.7)	$ (8.8)	$ (14.5)
Other postretirement benefit costs	4.9	4.9	5.2

The service cost component of net periodic benefit (income) costs related to employees of the operating segments are allocated to the operating segments based on their respective estimated census data.

ENVIRONMENTAL MATTERS

	Years ended December 31,		
	2020	*2019*	*2018*
Cash outlays:		*($ in millions)*	
Remedial and investigatory spending (charged to reserve)	$ 12.8	$ 12.2	$ 13.0
Capital spending	3.8	1.2	2.3
Plant operations (charged to cost of goods sold)	182.8	188.4	197.6
Total cash outlays	$ 199.4	$ 201.8	$ 212.9

Cash outlays for remedial and investigatory activities associated with former waste sites and past operations were not charged to income but instead were charged to reserves established for such costs identified and expensed to income in prior years. Cash outlays for normal plant operations for the disposal of waste and the operation and maintenance of pollution control equipment and facilities to ensure compliance with mandated and voluntarily imposed environmental quality standards were charged to income.

Total environmental-related cash outlays for 2021 are estimated to be approximately $210 million, of which approximately $19 million is expected to be spent on investigatory and remedial efforts, approximately $3 million on capital projects and approximately $188 million on normal plant operations. Remedial and investigatory spending is anticipated to be higher in 2021 than 2020 due to the timing of continuing remedial action plans and investigations. Historically, we have funded our environmental capital expenditures through cash flow from operations and expect to do so in the future.

Annual environmental-related cash outlays for site investigation and remediation, capital projects and normal plant operations are expected to range between $200 million to $220 million over the next several years, $15 million to $25 million of which is for investigatory and remedial efforts, which are expected to be charged against reserves recorded on our consolidated balance sheet. While we do not anticipate a material increase in the projected annual level of our environmental-related cash outlays for site investigation and remediation, there is always the possibility that such an increase may occur in the future in view of the uncertainties associated with environmental exposures.

Our liabilities for future environmental expenditures were as follows:

	December 31,		
	2020	*2019*	*2018*
		($ in millions)	
Beginning balance	$ 139.0	$ 125.6	$ 131.6
Charges to income	20.9	25.3	7.3
Remedial and investigatory spending	(12.8)	(12.2)	(13.0)
Foreign currency translation adjustments	0.1	0.3	(0.3)
Ending balance	$ 147.2	$ 139.0	$ 125.6

As is common in our industry, we are subject to environmental laws and regulations related to the use, storage, handling, generation, transportation, emission, discharge, disposal and remediation of, and exposure to, hazardous and non-hazardous substances and wastes in all of the countries in which we do business.

The establishment and implementation of national, state or provincial and local standards to regulate air, water and land quality affect substantially all of our manufacturing locations around the world. Laws providing for regulation of the manufacture, transportation, use and disposal of hazardous and toxic substances, and remediation of contaminated sites, have imposed additional regulatory requirements on industry, particularly the chemicals industry. In addition, implementation of environmental laws has required and will continue to require new capital expenditures and will increase plant operating costs. We employ waste minimization and pollution prevention programs at our manufacturing sites.

We are party to various government and private environmental actions associated with past manufacturing facilities and former waste disposal sites. Associated costs of investigatory and remedial activities are provided for in accordance with generally accepted accounting principles governing probability and the ability to reasonably estimate future costs. Our ability to estimate future costs depends on whether our investigatory and remedial activities are in preliminary or advanced stages. With respect to unasserted claims, we accrue liabilities for costs that, in our experience, we expect to incur to protect our interests against those unasserted claims. Our accrued liabilities for unasserted claims amounted to $9.0 million at December 31, 2020. With respect to asserted claims, we accrue liabilities based on remedial investigation, feasibility study, remedial action and operation, maintenance and monitoring (OM&M) expenses that, in our experience, we expect to incur in connection with the asserted claims. Required site OM&M expenses are estimated and accrued in their entirety for required periods not exceeding 30 years, which reasonably approximates the typical duration of long-term site OM&M.

Environmental provisions charged (credited) to income, which are included in cost of goods sold, were as follows:

	Years ended December 31,		
	2020	2019	2018
	($ in millions)		
Provisions charged to income	$ 20.9	$ 25.3	$ 7.3
Insurance recoveries for costs incurred and expensed	—	(4.8)	(111.0)
Environmental expense (income)	$ 20.9	$ 20.5	$ (103.7)

These charges relate primarily to remedial and investigatory activities associated with past manufacturing operations and former waste disposal sites and may be material to operating results in future years.

During 2018, we settled certain disputes with respect to insurance coverage for costs at various environmental remediation sites for $121.0 million. Environmental expense (income) for the year ended December 31, 2018 include insurance recoveries for environmental costs incurred and expensed in prior periods of $111.0 million. The recoveries are reduced by estimated liabilities of $10.0 million associated with claims by subsequent owners of certain of the settled environmental sites. Environmental expense (income) for the year ended December 31, 2019 included $4.8 million of recoveries associated with resolving the outstanding third party claims against the proceeds from the 2018 environmental insurance settlement.

Our total estimated environmental liability at December 31, 2020 was attributable to 58 sites, 14 of which were United States Environmental Protection Agency National Priority List sites. Nine sites accounted for 82% of our environmental liability and, of the remaining 49 sites, no one site accounted for more than 3% of our environmental liability. At seven of the nine sites, part of the site is in the long-term OM&M stage. At six of the nine sites, we are implementing a remedial action plan for part of the site. At five of the nine sites, a remedial design is being developed at part of the site and at four of the nine sites, part of the site is subject to a remedial investigation. All nine sites are either associated with past manufacturing operations or former waste disposal sites. None of the nine largest sites represents more than 23% of the liabilities reserved on our consolidated balance sheet at December 31, 2020 for future environmental expenditures.

Our consolidated balance sheets included liabilities for future environmental expenditures to investigate and remediate known sites amounting to $147.2 million at December 31, 2020, and $139.0 million at December 31, 2019, of which $128.2 million and $122.0 million, respectively, were classified as other noncurrent liabilities. Our environmental liability amounts do not take into account any discounting of future expenditures or any consideration of insurance recoveries or advances in technology. These liabilities are reassessed periodically to determine if environmental circumstances have changed and/or remediation efforts and our estimate of related costs have changed. As a result of these reassessments, future charges to income may be made for additional liabilities. Of the $147.2 million included on our consolidated balance sheet at December 31, 2020 for future environmental expenditures, we currently expect to utilize $88.5 million of the reserve for future environmental expenditures over the next 5 years, $27.6 million for expenditures 6 to 10 years in the future, and $31.1 million for expenditures beyond 10 years in the future. These estimates are subject to a number of risks and uncertainties, as described in "Environmental Costs" contained in Item 1A—"Risk Factors."

Environmental exposures are difficult to assess for numerous reasons, including the identification of new sites, developments at sites resulting from investigatory studies, advances in technology, changes in environmental laws and regulations and their application, changes in regulatory authorities, the scarcity of reliable data pertaining to identified sites, the difficulty in assessing the involvement and financial capability of other PRPs, our ability to obtain contributions from other parties and the lengthy time periods over which site remediation occurs. It is possible that some of these matters (the outcomes of which are subject to various uncertainties) may be resolved unfavorably to us, which could materially adversely affect our financial position or results of operations. At December 31, 2020, we estimate it is reasonably possible that we may have additional contingent environmental liabilities of $60 million in addition to the amounts for which we have already recorded as a reserve.

LEGAL MATTERS AND CONTINGENCIES

Please see the discussion of legal matters and contingencies within Item 8, under the heading of "Legal Matters" within Note 23, "Commitments and Contingencies."

LIQUIDITY, INVESTMENT ACTIVITY AND OTHER FINANCIAL DATA

Cash Flow Data

	Years ended December 31,		
	2020	2019	2018
Provided by (used for)	($ in millions)		
Net operating activities	$ 418.4	$ 617.3	$ 907.8
Capital expenditures	(298.9)	(385.6)	(385.2)
Payments under long-term supply contracts	(536.8)	—	—
Proceeds from disposition of non-consolidated affiliate	—	20.0	—
Net investing activities	(835.7)	(365.6)	(382.3)
Long-term debt borrowings (repayments), net	520.3	80.8	(376.1)
Common stock repurchased and retired	—	(145.9)	(50.0)
Debt issuance costs	(10.3)	(16.6)	(8.5)
Net financing activities	385.6	(209.3)	(564.8)

Operating Activities

For 2020, cash provided by operating activities decreased by $198.9 million from 2019, primarily due to a decrease in operating results, partially offset by a decrease in the investment in working capital from the prior year. During 2020, we executed a strategy to improve our working capital and manage our balance sheet to maximize our financial flexibility. For 2020, working capital decreased $141.6 million, which included an approximately $67 million investment in working capital to support Lake City operations, compared to a decrease of $11.0 million in 2019. In 2020, inventories decreased by $28.6 million, primarily as a result of lower raw material costs and lower Winchester inventory due to improved commercial ammunition demand, partially offset by the investment in Lake City inventory. Accounts payable and accrued liabilities increased by $149.3 million as a result of specific actions taken by management to improve Olin's working capital.

For 2019, cash provided by operating activities decreased by $290.5 million from 2018, primarily due to a decrease in operating results partially offset by a decrease in the investment in working capital from the prior year. For 2019, working capital decreased $11.0 million compared to an increase of $71.6 million in 2018. Receivables decreased from December 31, 2018 by $12.3 million primarily as a result of lower sales in the fourth quarter of 2019 compared to the fourth quarter of 2018 partially offset by a decrease in receivables sold under the accounts receivable factoring arrangement. In 2019, inventories decreased by $13.0 million and accounts payable and accrued liabilities decreased by $11.0 million. The decreases in inventories and accounts payable were primarily due to lower raw material costs.

Capital Expenditures

Capital spending was $298.9 million and $385.6 million in 2020 and 2019, respectively. Capital spending was 67% and 78% of depreciation in 2020 and 2019, respectively.

In 2017, we began a multi-year implementation of the Information Technology Project. The project standardized business processes across the chemicals businesses with the objective of maximizing cost effectiveness, efficiency and control across our global operations. The project was completed in 2020. Our results for the years ended December 31, 2020, 2019 and 2018 include $41.0 million, $56.0 million and $84.5 million, respectively, of capital spending and $73.9 million, $77.0 million and $36.5 million, respectively, of expenses associated with this project.

In 2021, we expect our capital spending to be in the $200 million range.

Investing Activities

For the year ended December 31, 2020, a payment of $461.0 million was made associated with long-term supply contracts to reserve additional ethylene at producer economics from Dow and a payment of $75.8 million was made associated with the resolution of a dispute over the allocation to Olin of certain capital costs incurred at our Plaquemine, LA site after the October 5, 2015 closing date of the acquisition of Dow's Chlorine Products business (the Acquisition).

On January 1, 2019, we sold our 9.1% limited partnership interest in Bay Gas for $20.0 million. The sale closed on February 7, 2019 which resulted in a gain of $11.2 million.

Financing Activities

For the year ended December 31, 2020, our long-term debt borrowings, net of long-term debt repayments, were $520.3 million, which primarily included borrowings of $500.0 million from the Delayed Draw Term Loan Facility, $497.5 million from the issuance of the 2025 Notes and $125.0 million under our Receivables Financing Agreement, partially offset by repayments for the redemption of $600.0 million of the 2023 Notes.

On October 15, 2020, Olin redeemed $600.0 million of the outstanding 9.75% senior notes due 2023. The 2023 Notes were redeemed at 102.438% of the principal amount of the 2023 Notes, resulting in a redemption premium of $14.6 million. The 2023 Notes were redeemed by drawing $500.0 million of the Delayed Draw Term Loan Facility along with utilizing $114.6 million of cash on hand.

On May 19, 2020, Olin issued $500.0 million aggregate principal amount of 9.50% senior notes due June 1, 2025. The 2025 Notes were issued at 99.5% of par value, the discount from which is included within long-term debt in the consolidated balance sheet. Interest on the 2025 Notes is payable semi-annually beginning on December 1, 2020. Proceeds from the 2025 Notes were used for general corporate purposes.

On May 8, 2020, we entered into a $1,300.0 million senior secured credit facility (Senior Secured Credit Facility) that amended our existing five-year, $2,000.0 million senior credit facility. The Senior Secured Credit Facility included a $500.0 million senior secured delayed-draw term loan facility (Delayed Draw Term Loan Facility) and a $800.0 million senior secured revolving credit facility (Senior Revolving Credit Facility). The maturity date for the Senior Secured Credit Facility is July 16, 2024. The amendment modified the financial covenants of the Senior Secured Credit Facility to be less restrictive and expanded the permitted use of proceeds of the Delayed Draw Term Loan Facility to include general corporate purposes.

For the year ended December 31, 2019, our long-term debt borrowings, net of long-term debt repayments, were $80.8 million, which included repayments of $543.0 million related to the $1,375.0 million Term Loan Facility and $150.0 million related to the Receivables Financing Agreement.

On July 16, 2019, Olin issued $750.0 million aggregate principal amount of 5.625% senior notes due August 1, 2029 (2029 Notes), which were registered under the Securities Act of 1933, as amended. Proceeds from the 2029 Notes were used to redeem the remaining balance of the $1,375.0 million Term Loan Facility of $493.0 million and $150.0 million of the Receivables Financing Agreement.

On July 16, 2019, Olin entered into a five-year, $2,000.0 million senior credit facility (2019 Senior Credit Facility), which replaced the existing $1,975.0 million senior credit facility (2017 Senior Credit Facility). In December 2019, Olin amended the 2019 Senior Credit Facility which amended the restrictive covenants of the agreement, including expanding the coverage and leverage ratios to be less restrictive over the next two and a half years. The 2019 Senior Credit Facility included a senior unsecured delayed-draw term loan facility in an aggregate principal amount of up to $1,200.0 million and an $800.0 million senior unsecured revolving credit facility.

In 2020, no shares were repurchased. In 2019, we repurchased and retired 8.0 million shares with a total value of $145.9 million.

In 2020, we paid debt issuance costs of $10.3 million, primarily for the issuance of the 2025 Notes and amendments to our Senior Secured Credit Facility and Receivables Financing Agreement. In 2019, we paid debt issuance costs of $16.6 million, primarily for the issuance of the 2029 Notes and the 2019 Senior Credit Facility.

The percent of total debt to total capitalization increased to 72.7% at December 31, 2020 compared to 58.0% at

December 31, 2019, as a result of a higher level of debt outstanding and lower shareholders' equity primarily resulting from the goodwill impairment charge.

Dividends per common share were $0.80 in 2020 and 2019. Total dividends paid on common stock amounted to $126.3 million and $129.3 million in 2020 and 2019, respectively. On February 15, 2021, our board of directors declared a dividend of $0.20 per share on our common stock, payable on March 10, 2021 to shareholders of record on March 2, 2021.

The payment of cash dividends is subject to the discretion of our board of directors and will be determined in light of then-current conditions, including our earnings, our operations, our financial condition, our capital requirements and other factors deemed relevant by our board of directors. In the future, our board of directors may change our dividend policy, including the frequency or amount of any dividend, in light of then-existing conditions.

LIQUIDITY AND OTHER FINANCING ARRANGEMENTS

Our principal sources of liquidity are from cash and cash equivalents, cash flow from operations and borrowings under our Senior Revolving Credit Facility, Receivables Financing Agreement and AR Facilities. Additionally, we believe that we have access to the debt and equity markets.

The overall cash decrease of $31.2 million in 2020 primarily reflects our payments under long-term supply contracts, capital spending and dividends paid, partially offset by borrowings under the 2025 Notes and a decrease in working capital. We believe, based on current and projected levels of cash flow from our operations, together with our cash and cash equivalents on hand and the availability to borrow under our Senior Revolving Credit Facility, Receivables Financing Agreement and AR Facilities, we have sufficient liquidity to meet our short-term and long-term needs to make required payments of interest on our debt, fund our operating needs, working capital, and capital expenditure requirements and comply with the financial ratios in our debt agreements.

On April 26, 2018, our board of directors authorized a share repurchase program for the purchase of shares of common stock at an aggregate price of up to $500.0 million. This program will terminate upon the purchase of $500.0 million of our common stock. For the year ended December 31, 2020, there were no shares repurchased. For the year ended December 31, 2019, 8.0 million shares were repurchased and retired at a cost of $145.9 million. As of December 31, 2020, a total of 10.1 million shares were repurchased and retired at a cost of $195.9 million and $304.1 million of common stock remained authorized to be repurchased.

On October 15, 2020, Olin redeemed $600.0 million of the outstanding 2023 Notes. The 2023 Notes were redeemed at 102.438% of the principal amount of the 2023 Notes, resulting in a redemption premium of $14.6 million. The 2023 Notes were redeemed by drawing $500.0 million of the Delayed Draw Term Loan Facility along with utilizing $114.6 million of cash on hand. On January 15, 2021, Olin redeemed the remaining $120.0 million of the outstanding 2023 Notes. The 2023 Notes were redeemed at 102.438% of the principal amount of the 2023 Notes, resulting in a redemption premium of $2.9 million. The remaining 2023 Notes were redeemed by utilizing $122.9 million of cash on hand.

On May 19, 2020, Olin issued $500.0 million aggregate principal amount of 9.50% senior notes due June 1, 2025. The 2025 Notes were issued at 99.5% of par value, the discount from which is included within long-term debt in the consolidated balance sheet. Interest on the 2025 Notes is payable semi-annually beginning on December 1, 2020. Proceeds from the 2025 Notes were used for general corporate purposes.

On May 8, 2020, we entered into a $1,300.0 million Senior Secured Credit Facility that amended the existing 2019 Senior Credit Facility. The Senior Secured Credit Facility included a Delayed Draw Term Loan Facility with aggregate commitments of $500.0 million and a Senior Revolving Credit Facility with aggregate commitments in an amount equal to $800.0 million. The maturity date for the Senior Secured Credit Facility is July 16, 2024. The amendment modified the financial covenants of the Senior Secured Credit Facility to be less restrictive and expanded the permitted use of proceeds of the Delayed Draw Term Loan Facility to include general corporate purposes.

The amendment also requires that the obligations under the Senior Secured Credit Facility be guaranteed by certain of our domestic subsidiaries, which are also guarantors of Olin's outstanding notes, with the exception of the $200.0 million senior notes due 2022. The obligations under the Senior Secured Credit Facility are also secured by liens on substantially all of Olin's and the subsidiary guarantors' personal property (Collateral), other than certain principal properties and capital stock of subsidiaries, and subject to certain other exceptions. The amendment provides that substantially all guarantees under the Senior Secured Credit Facility and liens on the Collateral may be released when our net leverage ratio is below 3.50 to 1.00 for two consecutive fiscal quarters.

On October 15, 2020, Olin drew the entire $500.0 million of the Delayed Draw Term Loan Facility. The Delayed Draw Term Loan Facility includes principal amortization amounts payable beginning the quarter ending after the facility is fully drawn at a rate of 5.0% per annum for the first two years, increasing to 7.5% per annum for the following year and to 10.0% per annum for the last two years. The Senior Revolving Credit Facility includes a $100.0 million letter of credit subfacility. At December 31, 2020, we had $799.6 million available under our $800.0 million Senior Revolving Credit Facility because we had issued $0.4 million of letters of credit.

Under the Senior Secured Credit Facility, we may select various floating-rate borrowing options. The actual interest rate paid on borrowings under the Senior Secured Credit Facility is based on a pricing grid which is dependent upon the net leverage ratio as calculated under the terms of the applicable facility for the prior fiscal quarter. The Senior Secured Credit Facility includes various customary restrictive covenants, including restrictions related to the ratio of secured debt to earnings before interest expense, taxes, depreciation and amortization (secured leverage ratio) and the ratio of earnings before interest expense, taxes, depreciation and amortization to interest expense (coverage ratio). The calculation of secured debt in our secured leverage ratio excludes borrowings under the Receivables Financing Agreement, up to a maximum of $250.0 million. As of December 31, 2020, the only secured borrowings included in the secured leverage ratio were $500.0 million for our Delayed Draw Term Loan Facility and $153.0 million for our Go Zone and Recovery Zone bonds. Compliance with these covenants is determined quarterly. We were in compliance with all covenants and restrictions under all our outstanding credit agreements as of December 31, 2020, and no event of default had occurred that would permit the lenders under our outstanding credit agreements to accelerate the debt if not cured. In the future, our ability to generate sufficient operating cash flows, among other factors, will determine the amounts available to be borrowed under these facilities. As a result of our restrictive covenant related to the secured leverage ratio, the maximum additional borrowings available to us could be limited in the future. The limitation, if an amendment or waiver from our lenders is not obtained, could restrict our ability to borrow the maximum amounts available under the Senior Revolving Credit Facility and the Receivables Financing Agreement. As of December 31, 2020, there were no covenants or other restrictions that limited our ability to borrow.

On July 16, 2019, Olin issued $750.0 million aggregate principal amount of 5.625% senior notes due August 1, 2029, which were registered under the Securities Act of 1933, as amended. Proceeds from the 2029 Notes were used to redeem the remaining balance of the $1,375.0 million term loan facility of $493.0 million and $150.0 million of the Receivables Financing Agreement.

On July 16, 2019, Olin also entered into a five-year, $2,000.0 million senior credit facility, which replaced the existing 2017 Senior Credit Facility. In December 2019, Olin amended the 2019 Senior Credit Facility which amended the restrictive covenants of the agreement, including expanding the coverage and leverage ratios to be less restrictive over the next two and a half years. The 2019 Senior Credit Facility included a senior unsecured delayed-draw term loan facility in an aggregate principal amount of up to $1,200.0 million and an $800.0 million senior unsecured revolving credit facility.

In connection with the Acquisition, Olin and Dow entered into arrangements for the long-term supply of ethylene by Dow to Olin, pursuant to which, among other things, Olin made upfront payments in order to receive ethylene at producer economics and for certain reservation fees and for the option to obtain additional future ethylene supply at producer economics. On February 27, 2017, we exercised the remaining option to obtain additional ethylene at producer economics from Dow. In connection with the exercise of this option, we also secured a long-term customer arrangement. As a result, during 2020 an additional payment was made to Dow for $461.0 million.

On July 16, 2019, our existing $250.0 million Receivables Financing Agreement was extended to July 15, 2022 and downsized to $10.0 million with the option to expand (Receivables Financing Agreement). In 2020, we amended the Receivables Financing Agreement to expand the borrowing capacity to $250.0 million. The Receivables Financing Agreement includes a minimum borrowing requirement of 50% of the facility limit or available borrowing capacity, whichever is lesser. The administrative agent for our Receivables Financing Agreement is PNC Bank, National Association. Under the Receivables Financing Agreement, our eligible trade receivables are used for collateralized borrowings and continue to be serviced by us. In addition, the Receivables Financing Agreement incorporates the secured leverage covenant that is contained in the Senior Secured Credit Facility. For the year ended December 31, 2019, the outstanding balance of the $250.0 million Receivables Financing Agreement of $150.0 million was repaid with proceeds from the issuance of 2029 Notes. As of December 31, 2020 and 2019, we had $125.0 million and zero, respectively, drawn under the agreement. As of December 31, 2020, $332.8 million of our trade receivables were pledged as collateral. As of December 31, 2020, we had $124.0 million of additional borrowing capacity under the Receivables Financing Agreement.

Olin also has trade accounts receivable factoring arrangements (AR Facilities) and pursuant to the terms of the AR Facilities, certain of our subsidiaries may sell their accounts receivable up to a maximum of $228.0 million. We will continue to service the outstanding accounts sold. These receivables qualify for sales treatment under ASC 860 "Transfers and Servicing" and, accordingly, the proceeds are included in net cash provided by operating activities in the consolidated statements of cash flows. The gross amount of receivables sold for the years ended December 31, 2020 and 2019 totaled $854.3 million and $984.8 million, respectively. The factoring discount paid under the AR Facilities is recorded as interest expense on the consolidated statements of operations. The factoring discount for the years ended December 31, 2020 and 2019 was $1.5 million and $2.9 million, respectively. The agreements are without recourse and therefore no recourse liability has been recorded as of December 31, 2020. As of December 31, 2020 and 2019, $48.8 million and $63.1 million, respectively, of receivables qualifying for sales treatment were outstanding and will continue to be serviced by us.

For 2020, cash provided by operating activities decreased by $198.9 million from 2019, primarily due to a decrease in operating results, partially offset by a decrease in the investment in working capital from the prior year. During 2020, we executed a strategy to improve our working capital and manage our balance sheet to maximize our financial flexibility. For 2020, working capital decreased $141.6 million, which included an approximately $67 million investment in working capital to support Lake City operations, compared to a decrease of $11.0 million in 2019. In 2020, inventories decreased by $28.6 million, primarily as a result of lower raw material costs and lower Winchester inventory due to improved commercial ammunition demand, partially offset by the investment in Lake City inventory. Accounts payable and accrued liabilities increased by $149.3 million as a result of specific actions taken by management to improve Olin's working capital.

Capital spending was $298.9 million and $385.6 million in 2020 and 2019, respectively. Capital spending was 67% and 78% of depreciation in 2020 and 2019, respectively.

In 2017, we began a multi-year implementation of the Information Technology Project. The project standardized business processes across the chemicals businesses with the objective of maximizing cost effectiveness, efficiency and control across our global operations. The project was completed during 2020. Our results for the years ended December 31, 2020, 2019 and 2018 include $41.0 million, $56.0 million and $84.5 million, respectively, of capital spending and $73.9 million, $77.0 million and $36.5 million, respectively, of expenses associated with this project.

In 2021, we expect our capital spending to be in the $200 million range, which is expected to be an additional $100 million lower than 2020 levels.

At December 31, 2020, we had total letters of credit of $80.4 million outstanding, of which $0.4 million were issued under our Senior Revolving Credit Facility. The letters of credit were used to support certain long-term debt, certain workers compensation insurance policies, certain plant closure and post-closure obligations, certain international payment obligations and certain international pension funding requirements.

Our current debt structure is used to fund our business operations. As of December 31, 2020, we had long-term borrowings, including the current installment and finance lease obligations, of $3,863.8 million, of which $780.9 million was at variable rates. Annual maturities of long-term debt, including finance lease obligations, are $26.3 million in 2021, $351.1 million in 2022, $158.4 million in 2023, $483.3 million in 2024, $1,003.1 million in 2025 and a total of $1,883.0 million thereafter. Commitments from banks under our Senior Revolving Credit Facility, Receivables Financing Agreement and AR Facilities are an additional source of liquidity. Included within the $3,863.8 million of long-term borrowings on the consolidated balance sheet as of December 31, 2020 were unamortized deferred debt issuance costs, unamortized bond original issue discount and deferred losses on fair value interest rate swaps of $41.4 million.

We have registered an undetermined amount of securities with the SEC, so that, from time-to-time, we may issue debt securities, preferred stock and/or common stock and associated warrants in the public market under that registration statement.

Supplemental Guarantor Financial Information

Olin Corporation (the Parent Issuer) issued $500.0 million aggregate principal amount of 9.50% senior notes due 2025, $500.0 million aggregate principal amount of 5.125% senior notes due 2027, $750.0 million aggregate principal amount of 5.625% senior notes due 2029 and $550.0 million aggregate principal amount of 5.00% senior notes due 2030 (collectively, the Senior Notes) which are wholly and unconditionally guaranteed by Sunbelt Chlor Alkali Partnership, Olin Chlorine 7, LLC, Blue Cube Operations, LLC, Pioneer America LLC, Olin Winchester, LLC and Winchester Ammunition, Inc. (collectively, the Subsidiary Guarantors) and Blue Cube Spinco LLC (the Subsidiary Issuer). The Subsidiary Guarantors and Subsidiary Issuer are fully consolidated subsidiaries of the Parent Issuer. The Subsidiary Issuer issued $720.0 million aggregate principal amount of 9.75% senior notes due 2023 and $500.0 million aggregate principal amount of 10.00% senior notes due 2025 (collectively, the Blue Cube Notes), which are wholly and unconditionally guaranteed by Olin Corporation (the Parent Guarantor) along with the Subsidiary Guarantors. All guarantees are joint and several. This financial information is being presented in relation to the guarantees of the payment of principal, interest and premium (if any) on the Senior Notes and Blue Cube Notes.

The guarantees are subject to release upon the occurrence of certain customary release covenants, including, but not limited to, (i) the sale or other disposition, including the sale of substantially all of the assets or the capital stock, of the applicable subsidiary guarantor, (ii) the release, discharge or other termination of the debt (or the guarantee thereof) which triggered the applicable guarantee requirement, (iii) the legal defeasance, covenant defeasance or discharge of the applicable indenture or (iv) the subsidiary guarantor no longer being a restricted subsidiary under the applicable indenture. There are no significant organizational structure factors, limitations on enforceability of the guarantees, additional restrictions imposed on dividends or other significant factors that would affect payments to the holders of the Senior Notes or Blue Cube Notes.

The following tables present summarized financial information of the Parent Guarantor, Subsidiary Guarantors, Parent Issuer and Subsidiary Issuer on a combined basis after elimination of (i) intercompany transactions and balances among the guarantors and issuers and (ii) equity (loss) in earnings from and investments in any subsidiary that is a non-guarantor subsidiary or issuer.

	Year Ended December 31, 2020
Summarized Statement of Operations	*($ in millions)*
Sales	$ 4,299.8
Gross margin	235.6
Operating loss	(641.5)
Loss before income taxes	(903.5)
Net loss	(819.5)

	December 31,	
	2020	***2019***
Summarized Balance Sheets	*($ in millions)*	
Assets		
Other current assets	$ 947.0	$ 884.5
Non-current assets due from non-guarantor subsidiaries	—	420.4
Other non-current assets	5,549.0	6,259.1
Liabilities		
Current liabilities due to non-guarantor subsidiaries	$ 508.7	$ 738.0
Other current liabilities	898.1	718.7
Other non-current liabilities	4,910.1	5,118.4

CONTRACTUAL OBLIGATIONS AND OFF-BALANCE SHEET ARRANGEMENTS

Our long-term contractual commitments, including the on and off-balance sheet arrangements, consisted of the following:

	Payments Due by Period				
Contractual Obligations	***Less than 1 Year***	***1-3 Years***	***3-5 Years***	***More than 5 Years***	***Total***
Debt obligations, including finance lease obligations[1]	$ 26.3	$ 509.5	$ 1,486.4	$ 1,883.0	$ 3,905.2
Interest payments under debt obligations[2]	243.6	463.1	363.6	334.2	1,404.5
Contingent tax liability	6.9	5.6	3.9	4.9	21.3
Domestic qualified pension plan contributions[3]	—	—	—	—	—
International qualified pension plan contributions[4]	4.9	8.2	10.7	334.7	358.5
Non-qualified pension plan payments	0.8	0.8	0.7	3.6	5.9
Postretirement benefit payments	3.4	6.7	6.2	39.8	56.1
Operating leases	83.6	119.5	75.2	148.4	426.7
Off-Balance Sheet Commitments:					
Purchasing commitments:					
Raw materials	718.5	1,314.8	1,192.5	2,390.6	5,616.4
Capital expenditures	4.0	—	—	—	4.0
Utilities	0.3	—	—	—	0.3
Total	$ 1,092.3	$ 2,428.2	$ 3,139.2	$ 5,139.2	$ 11,798.9

(1) Excludes unamortized debt issuance costs, unamortized bond original issue discount and deferred losses on fair value interest rate swaps of $41.4 million at December 31, 2020. All debt obligations are assumed to be held until maturity.

(2) For the purposes of this table, we have assumed for all periods presented that there are no changes in the rates from those in effect at December 31, 2020 which ranged from 0.21% to 10.00%.

(3) Given the inherent uncertainty as to actual minimum funding requirements for qualified defined benefit pension plans, no amounts are included in this table for any period beyond one year. Based on the current funding requirements, we will not be required to make any cash contributions to the domestic qualified defined benefit pension plan at least through 2021.

(4) These amounts are only estimated payments assuming for our foreign qualified pension plans a weighted average annual expected rate of return on pension plan assets of 4.4% and a discount rate on pension plan obligations of 0.8%. These estimated payments are subject to significant variation and the actual payments may be more than the amounts estimated. In connection with international qualified defined benefit pension plans we made cash contributions of $2.1 million, $2.4 million and $2.6 million in 2020, 2019 and 2018, respectively, and we anticipate less than $5 million of cash contributions to international qualified defined benefit pension plans in 2021.

Non-cancelable operating leases and purchasing commitments are utilized in our normal course of business for our projected needs. Our operating lease commitments are primarily for railroad cars, but also include logistics, manufacturing, office and storage facilities and equipment, information technology equipment and land. Virtually none of our lease agreements contain escalation clauses or step rent provisions. We have supply contracts with various third parties for certain raw materials, including ethylene, electricity, propylene and benzene. These contracts have initial terms ranging from several to 20 years. For losses that we believe are probable and which are estimable, we have accrued for such amounts in our consolidated balance sheets. In addition to the table above, we have various commitments and contingencies including: defined benefit and postretirement healthcare plans (as described below), environmental matters (see discussion under "Environmental Matters") and litigation claims (see discussion under Item 8, under the heading of "Legal Matters" within Note 23, "Commitments and Contingencies").

We have several defined benefit pension and defined contribution plans, as described in Note 13 "Pension Plans" and Note 17 "Contributing Employee Ownership Plan" in the notes to consolidated financial statements contained in Item 8. We fund the defined benefit pension plans based on the minimum amounts required by law plus such amounts we deem appropriate. We have postretirement healthcare plans that provide health and life insurance benefits to certain retired employees and their beneficiaries, as described in Note 14 "Postretirement Benefits" in the notes to consolidated financial statements contained in Item 8. The defined contribution and other postretirement plans are not pre-funded and expenses are paid by us as incurred.

We also have standby letters of credit of $80.4 million of which $0.4 million have been issued through our Senior Revolving Credit Facility. At December 31, 2020, we had $799.6 million available under our Senior Revolving Credit Facility because we had issued $0.4 million of letters of credit.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, sales and expenses, and related disclosure of contingent assets and liabilities. Significant estimates in our consolidated financial statements include goodwill recoverability, environmental, restructuring and other unusual items, litigation, income tax reserves including deferred tax asset valuation allowances, pension, postretirement and other benefits and allowance for doubtful accounts. We base our estimates on prior experience, current facts and circumstances and other assumptions. Actual results may differ from these estimates.

We believe the following critical accounting policies affect the more significant judgments and estimates used in the preparation of the consolidated financial statements.

Goodwill

Goodwill is not amortized, but is reviewed for impairment annually in the fourth quarter and/or when circumstances or other events indicate that impairment may have occurred. ASC 350 "Intangibles—Goodwill and Other" (ASC 350) permits entities to make a qualitative assessment of whether it is more likely than not that a reporting unit's fair value is less than its carrying amount before applying the goodwill impairment test. Circumstances that are considered as part of the qualitative assessment and could trigger a quantitative impairment test include, but are not limited to: a significant adverse change in the business climate; a significant adverse legal judgment; adverse cash flow trends; an adverse action or assessment by a government agency; unanticipated competition; sustained decline in our stock price; and a significant restructuring charge within a reporting unit. We define reporting units at the business segment level or one level below the business segment level. For purposes of testing goodwill for impairment, goodwill has been allocated to our reporting units to the extent it relates to each reporting unit.

It is our practice, at a minimum, to perform a quantitative goodwill impairment test in the fourth quarter every three years. In the fourth quarter of 2019, we performed our triennial quantitative goodwill impairment test for our reporting units. We use a discounted cash flow approach to develop the estimated fair value of a reporting unit when a quantitative review is performed. Management judgment is required in developing the assumptions for the discounted cash flow model. We also corroborate our discounted cash flow analysis by evaluating a market-based approach that considers earnings before interest, taxes, depreciation and amortization (EBITDA) multiples from a representative sample of comparable public companies. As a further indicator that each reporting unit has been valued appropriately using a discounted cash flow model, the aggregate fair value of all reporting units is reconciled to the total market value of Olin. An impairment would be recorded if the carrying amount of a reporting unit exceeded the estimated fair value. Based on the aforementioned analysis, the estimated fair value of our reporting units exceeded the carrying value of the reporting units.

During the first quarter of 2020, our market capitalization declined significantly compared to the fourth quarter of 2019. Over the same period, the equity value of our peer group companies and the overall U.S. stock market also declined significantly amid market volatility. These declines were driven by the uncertainty surrounding the outbreak of the COVID-19 global pandemic and other macroeconomic events impacting the various industries in which Olin and our peers participate. Additionally, the various governmental, business and consumer responses to the pandemic were expected to have a negative impact on the near-term demand for several of the products produced by our Chlor Alkali Products and Vinyls and Epoxy businesses. The full extent and duration of the impact of COVID-19 on our operations and financial performance was unknown at the time. As a result of these events, we identified triggering events associated with a significant overall decrease in our stock price, a significant adverse change in the business climate and a significant reduction in near-term cash flow projections and performed a quantitative goodwill impairment test during the first quarter of 2020. We used a discounted cash flow approach to develop the estimated fair value of our reporting units. Based on the aforementioned analysis, the estimated fair value of our reporting units exceeded the carrying value of the reporting units and no impairment charges were recorded.

Throughout the second and third quarters of 2020, the spread of the COVID-19 pandemic and the associated response has caused significant disruptions in the U.S. and global economies, resulting in the disruption of the supply and demand fundamentals of our Chemicals businesses. The various governmental, business and consumer responses to the pandemic continued to negatively impact the demand for several of the products produced by our Chlor Alkali Products and Vinyls and Epoxy businesses resulting in lower volumes and pricing during 2020 compared to 2019. Due to these factors, the triggering events identified in the first quarter associated with a significant adverse change in the business climate and a significant adverse reduction in near-term cash flow projections have persisted during 2020. Throughout the second and third quarters of 2020, the equity value of our peer group companies and the overall U.S. stock market improved significantly while Olin's stock price remained low. During the three months ended September 30, 2020, we identified a triggering event associated with a sustained significant overall decrease in our stock price. As a result, we performed an updated quantitative goodwill impairment test during the third quarter of 2020. We used a discounted cash flow approach to develop the estimated fair value of our reporting units.

Fair value determinations require considerable judgment and are sensitive to changes in underlying assumptions, estimates and market factors. The discount rate, profitability assumptions and terminal growth rate of our reporting units and the supply and demand fundamentals of the chlor alkali industry were the material assumptions utilized in the discounted cash flow model used to estimate the fair value of each reporting unit. The discount rate reflects a weighted-average cost of capital, which is calculated, in part based on observable market data. Some of this data (such as the risk free or treasury rate and the pretax cost of debt) are based on the market data at a point in time. Other data (such as the equity risk premium) are based upon market data over time for a peer group of companies in the chemical manufacturing or distribution industries with a market capitalization premium added, as applicable. Also factoring into the discount rate was a market participant's perceived risk (such as the company specific risk premium) in the valuation implied by the sustained reduction in our stock price.

The discounted cash flow analysis requires estimates, assumptions and judgments about future events. Our analysis uses our internally generated long-range plan. Specifically, the assumptions in our long-range plan about terminal growth rates, forecasted capital expenditures and changes in future working capital requirements are used to determine the implied fair value of each reporting unit. The long-range plan reflects management judgment, supplemented by independent chemical industry analyses which provide multi-year chlor alkali industry operating and pricing forecasts.

As a further indicator that each reporting unit has been valued appropriately using a discounted cash flow model, the aggregate fair value of all reporting units is reconciled to the total market value of Olin. Due to the sustained decline in our stock price, the decrease in the value of our reporting units reflects a market participant's perceived risk in the valuation implied by the sustained reduction in our stock price. As a result of this assessment, the carrying values of our Chlor Alkali Products and Vinyls and Epoxy reporting units exceeded the fair values which resulted in pre-tax goodwill impairment charges of $557.6 million and $142.2 million, respectively, for the year ended December 31, 2020. The goodwill impairment charge was calculated as the amount that the carrying value of the reporting unit, including any goodwill, exceeded its fair value and therefore the carrying value of our reporting units equal their fair value upon completion of the goodwill impairment test.

We believe the assumptions used in our goodwill impairment analysis are appropriate and result in reasonable estimates of the implied fair value of each reporting unit. However, given the economic environment and the uncertainties regarding the impact on our business, there can be no assurance that our estimates and assumptions, made for purposes of our goodwill impairment testing, will prove to be an accurate prediction of the future. If our assumptions regarding future performance are not achieved, or if our stock price experiences further sustained declines, we may be required to record additional goodwill impairment charges in future periods. It is not possible at this time to determine if any such future impairment charge would result or, if it does, whether such charge would be material.

No impairment charges were recorded for 2019 or 2018.

Environmental

Accruals (charges to income) 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, based upon current law and existing technologies. These amounts, which are not discounted and are exclusive of claims against third parties, are adjusted periodically as assessments and remediation efforts progress or additional technical or legal information becomes available. Environmental costs are capitalized if the costs increase the value of the property and/or mitigate or prevent contamination from future operations. Environmental costs and recoveries are included in costs of goods sold.

Environmental exposures are difficult to assess for numerous reasons, including the identification of new sites, developments at sites resulting from investigatory studies, advances in technology, changes in environmental laws and regulations and their application, changes in regulatory authorities, the scarcity of reliable data pertaining to identified sites, the difficulty in assessing the involvement and financial capability of other PRPs and our ability to obtain contributions from other parties and the lengthy time periods over which site remediation occurs. It is possible that some of these matters (the outcomes of which are subject to various uncertainties) may be resolved unfavorably to us, which could materially adversely affect our financial position, cash flows or results of operations.

NEW ACCOUNTING PRONOUNCEMENTS

Discussion of new accounting pronouncements can be referred to under Item 8, within Note 3, "Recent Accounting Pronouncements."

DERIVATIVE FINANCIAL INSTRUMENTS

We are exposed to market risk in the normal course of our business operations due to our purchases of certain commodities, our ongoing investing and financing activities and our operations that use foreign currencies. The risk of loss can be assessed from the perspective of adverse changes in fair values, cash flows and future earnings. We have established policies and procedures governing our management of market risks and the use of financial instruments to manage exposure to such risks. ASC 815 requires an entity to recognize all derivatives as either assets or liabilities in the consolidated balance sheets and measure those instruments at fair value. In accordance with ASC 815, we designate derivative contracts as cash flow hedges of forecasted purchases of commodities and forecasted interest payments related to variable-rate borrowings and designate certain interest rate swaps as fair value hedges of fixed-rate borrowings. We do not enter into any derivative instruments for trading or speculative purposes.

Energy costs, including electricity and natural gas, and certain raw materials used in our production processes are subject to price volatility. Depending on market conditions, we may enter into futures contracts, forward contracts, commodity swaps and put and call option contracts in order to reduce the impact of commodity price fluctuations. The majority of our commodity derivatives expire within one year.

For derivative instruments that are designated and qualify as a cash flow hedge, the change in fair value of the derivative is recognized as a component of other comprehensive income (loss) until the hedged item is recognized in earnings.

We use cash flow hedges for certain raw material and energy costs such as copper, zinc, lead, ethane, electricity and natural gas to provide a measure of stability in managing our exposure to price fluctuations associated with forecasted purchases of raw materials and energy used in our manufacturing process. Settlements on commodity derivative contracts resulted in (losses) gains of $(14.9) million, $(31.1) million, and $5.4 million in 2020, 2019, and 2018, respectively which were included in cost of goods sold. At December 31, 2020, we had open derivative notional contract positions through 2027 totaling $214.1 million (2019—$174.6 million). If all open futures contracts had been settled on December 31, 2020, we would have recognized a pretax gain of $28.4 million.

If commodity prices were to remain at December 31, 2020 levels, approximately $16.6 million of deferred gains, net of tax, would be reclassified into earnings during the next twelve months. The actual effect on earnings will be dependent on actual commodity prices when the forecasted transactions occur.

We use interest rate swaps as a means of minimizing cash flow fluctuations that may arise from volatility in interest rates of our variable-rate borrowings. For the years ended December 31, 2019 and 2018, $4.3 million and $8.9 million, respectively, of income was recorded to interest expense on the accompanying consolidated statements of operations related to these swap agreements.

We also use interest rate swaps as a means of managing interest expense and floating interest rate exposure to optimal levels. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative as well as the offsetting loss or gain on the hedged item attributable to the hedged risk are recognized in current earnings. We include the gain or loss on the hedged items (fixed-rate borrowings) in the same line item, interest expense, as the offsetting loss or gain on the related interest rate swaps.

In August 2019, we terminated the interest rate swaps designated as fair value hedges which resulted in a loss of $2.3 million that will be deferred as an offset to the carrying value of the related debt and will be recognized to interest expense through October 2025. For the years ended December 31, 2020, 2019 and 2018, $0.4 million, $2.6 million and $2.1 million, respectively, of expense was recorded to interest expense on the accompanying consolidated statements of operations related to these swap agreements.

We actively manage currency exposures that are associated with net monetary asset positions, currency purchases and sales commitments denominated in foreign currencies and foreign currency denominated assets and liabilities created in the normal course of business. We enter into forward sales and purchase contracts to manage currency risk to offset our net exposures, by currency, related to the foreign currency denominated monetary assets and liabilities of our operations. At December 31, 2020, we had outstanding forward contracts to buy foreign currency with a notional value of $169.9 million and to sell foreign currency with a notional value of $113.6 million. All of the currency derivatives expire within one year and are for U.S. dollar (USD) equivalents. The counterparties to the forward contracts are large financial institutions; however, the risk of loss to us in the event of nonperformance by a counterparty could impact our financial position or results of operations. At December 31, 2019, we had outstanding forward contracts to buy foreign currency with a notional value of $140.6 million and to sell foreign currency with a notional value of $99.2 million.

Our foreign currency forward contracts and certain commodity derivatives did not meet the criteria to qualify for hedge accounting. The effect on operating results of items not qualifying for hedge accounting was a gain (loss) of $17.7 million, $(4.0) million and $(5.4) million in 2020, 2019 and 2018, respectively.

The fair value of our derivative asset and liability balances were:

	December 31,	
	2020	***2019***
	($ in millions)	
Other current assets	$ 24.2	$ 1.9
Other assets	7.2	0.7
Total derivative asset	$ 31.4	$ 2.6
Accrued liabilities	$ 0.1	$ 19.0
Other liabilities	0.6	1.8
Total derivative liability	$ 0.7	$ 20.8

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to market risk in the normal course of our business operations due to our purchases of certain commodities, our ongoing investing and financing activities and our operations that use foreign currencies. The risk of loss can be assessed from the perspective of adverse changes in fair values, cash flows and future earnings. We have established policies and procedures governing our management of market risks and the use of financial instruments to manage exposure to such risks.

Energy costs, including electricity and natural gas, and certain raw materials used in our production processes are subject to price volatility. Depending on market conditions, we may enter into futures contracts, forward contracts, commodity swaps and put and call option contracts in order to reduce the impact of commodity price fluctuations. As of December 31, 2020, we maintained open positions on commodity contracts with a notional value totaling $214.1 million ($174.6 million at December 31, 2019). Assuming a hypothetical 10% increase in commodity prices, which are currently hedged, as of December 31, 2020, we would experience an $21.4 million ($17.5 million at December 31, 2019) increase in our cost of inventory purchased, which would be substantially offset by a corresponding increase in the value of related hedging instruments.

We transact business in various foreign currencies other than the USD which exposes us to movements in exchange rates which may impact revenue and expenses, assets and liabilities and cash flows. Our significant foreign currency exposure is denominated with European currencies, primarily the Euro, although exposures also exist in other currencies of Asia Pacific, Latin America, Middle East and Africa. For all derivative positions, we evaluated the effects of a 10% shift in exchange rates between those currencies and the USD, holding all other assumptions constant. Unfavorable currency movements of 10% would negatively affect the fair values of the derivatives held to hedge currency exposures by $24.7 million. These unfavorable changes would generally have been offset by favorable changes in the values of the underlying exposures.

We are exposed to changes in interest rates primarily as a result of our investing and financing activities. Our current debt structure is used to fund business operations, and commitments from banks under our Senior Revolving Credit Facility, Receivables Financing Agreement and AR Facilities are sources of liquidity. As of December 31, 2020, we had long-term borrowings, including current installments of long-term debt and finance lease obligations, of $3,863.8 million ($3,340.8 million at December 31, 2019) of which $780.9 million ($155.9 million at December 31, 2019) was issued at variable rates. Included within long-term borrowings on the consolidated balance sheets were deferred debt issuance costs, unamortized bond original issue discount and deferred losses on fair value interest rate swaps.

Assuming no changes in the $780.9 million of variable-rate debt levels from December 31, 2020, we estimate that a hypothetical change of 100-basis points in the LIBOR interest rates from 2020 would impact annual interest expense by $7.8 million.

Our interest rate swaps increased interest expense by $0.4 million in 2020 and reduced interest expense by $1.7 million and $6.8 million in 2019 and 2018, respectively.

If the actual changes in commodities, foreign currency or interest pricing is substantially different than expected, the net impact of commodity risk, foreign currency risk or interest rate risk on our cash flow may be materially different than that disclosed above.

We do not enter into any derivative financial instruments for speculative purposes.

CAUTIONARY STATEMENT ABOUT FORWARD-LOOKING STATEMENTS

This report includes forward-looking statements. These statements relate to analyses and other information that are based on management’s beliefs, certain assumptions made by management, forecasts of future results and current expectations, estimates and projections about the markets and economy in which we and our various segments operate. The statements contained in this report that are not statements of historical fact may include forward-looking statements that involve a number of risks and uncertainties.

We have used the words "anticipate,” "intend,” "may,” "expect,” "believe,” "should,” "plan,” "estimate,” "project,” "forecast,” "optimistic” and variations of such words and similar expressions in this report to identify such forward-looking statements. These statements are not guarantees of future performance and involve certain risks, uncertainties and assumptions, which are difficult to predict and many of which are beyond our control. Therefore, actual outcomes and results may differ materially from those matters expressed or implied in such forward-looking statements. We undertake no obligation to update publicly any forward-looking statements, whether as a result of future events, new information or otherwise.

The risks, uncertainties and assumptions involved in our forward-looking statements include those discussed under Item 1A—"Risk Factors.” You should consider all of our forward-looking statements in light of these factors. In addition, other risks and uncertainties not presently known to us or that we consider immaterial could affect the accuracy of our forward-looking statements.

Item 8. CONSOLIDATED FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

MANAGEMENT REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

The management of Olin Corporation is responsible for establishing and maintaining adequate internal control over financial reporting. Olin's internal control system was designed to provide reasonable assurance to the company's management and board of directors regarding the preparation and fair presentation of published financial statements.

All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation, and may not prevent or detect all misstatements.

The management of Olin Corporation has assessed the effectiveness of the company's internal control over financial reporting as of December 31, 2020. In making this assessment, we used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in *Internal Control - Integrated Framework (2013)* to guide our analysis and assessment. Based on our assessment as of December 31, 2020, the company's internal control over financial reporting was effective based on those criteria.

Our independent registered public accountants, KPMG LLP, have audited and issued a report on our internal control over financial reporting, which appears in this Form 10-K.

/s/ Scott Sutton
President and Chief Executive Officer

/s/ Todd A. Slater
Vice President and Chief Financial Officer

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors
Olin Corporation:

Opinions on the Consolidated Financial Statements and Internal Control Over Financial Reporting

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

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020 based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company has changed its method of accounting for leases as of January 1, 2019 due to the adoption of Accounting Standards Update 2016-02 - *Leases* and amendments thereto.

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 the accompanying Management Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's consolidated financial statements and an opinion 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.

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 (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) 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 (3) 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 matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) 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 matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Valuation of goodwill

As discussed in Notes 2 and 11 to the consolidated financial statements, the carrying amount of goodwill as of December 31, 2020 was $1,420.2 million. The goodwill balances of the Chlor Alkali Products and Vinyls and Epoxy reporting units as of December 31, 2020 were $1,275.3 million and $144.9 million, respectively. The Company performs a goodwill impairment assessment on an annual basis during the fourth quarter of each fiscal year and whenever circumstances or other events indicate that impairment may have occurred. Reporting units are tested for impairment by comparing the estimated fair value of each reporting unit with its carrying amount. If the carrying amount of a reporting unit exceeds its estimated fair value, an impairment loss is recorded. Management generally uses the discounted cash flow method under the income approach to estimate the fair value of reporting units. During 2020, management identified triggering events that necessitated the performance of quantitative impairment tests and recorded an impairment of goodwill of $557.6 million and $142.2 million in the Chlor Alkali Products and Vinyls and Epoxy reporting units, respectively.

We identified the evaluation of the recoverability of the carrying value of goodwill for each reporting unit as a critical audit matter. Subjective and challenging auditor judgment was required to evaluate certain assumptions used in the Company's estimate of the fair value of the reporting units, including the impact of those assumptions on the determination of the goodwill impairment recorded. Specifically, the revenue projections and the discount rate assumptions underlying the Company's determination of the fair value of the reporting units were challenging to audit as changes to those assumptions had a significant effect on the estimate of the fair value for the reporting units and the amount of impairment recorded.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's goodwill impairment assessment process, including controls related to the development of the revenue projections and discount rate assumptions. We evaluated the Company's revenue projections for each reporting unit, including revenue growth rates, by comparing them to the Company's historical growth rates, industry reports, and peer companies' financial information. In addition, we involved a valuation professional with specialized skill and knowledge who assisted in evaluating the Company's selection of discount rates, by comparing them against a discount rate range that was independently developed using publicly available market data for comparable entities.

Evaluation of environmental obligations

As discussed in Notes 2 and 21 to the consolidated financial statements, the Company has recorded liabilities for future environmental expenditures of $147.2 million as of December 31, 2020. The Company accrues a liability for environmental matters when it is probable that a liability has been incurred and the amount of the liability can be reasonably estimated based upon current law and existing technologies. The liability is adjusted periodically as assessment and remediation efforts progress or additional technical or legal information becomes available.

We identified the evaluation of the environmental liabilities as a critical audit matter. This required challenging auditor judgment due to the nature of the estimate and assumptions, including judgments about future events and uncertainties in required remediation activities and the time period over which remediation will occur.

The following are the primary procedures that we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's process to estimate environmental obligations, including controls related to the monitoring of the liability as compared to remedial activities required by regulatory authorities. We involved an environmental professional with specialized skills and knowledge who assisted in evaluating the Company's planned remediation activities for certain sites, the time period over which remediation will occur, and changes in the liability and assumptions from those used in the prior period, including comparing the Company's planned remediation activities to those communicated to regulatory authorities and to those commonly observed in conducting remediation.

/s/ KPMG LLP

We have served as the Company's auditor since 1954.

St. Louis, Missouri
February 22, 2021

CONSOLIDATED BALANCE SHEETS
December 31
(In millions, except per share data)

Assets	**2020**	**2019**
Current assets:		
Cash and cash equivalents	$ 189.7	$ 220.9
Receivables, net	770.9	760.4
Income taxes receivable	15.1	13.9
Inventories, net	674.7	695.7
Other current assets	66.7	23.1
Total current assets	1,717.1	1,714.0
Property, plant and equipment, net	3,171.0	3,323.8
Operating lease assets, net	360.7	377.8
Deferred income taxes	11.2	35.3
Other assets	1,191.3	1,169.1
Intangible assets, net	399.4	448.1
Goodwill	1,420.2	2,119.7
Total assets	$ 8,270.9	$ 9,187.8
Liabilities and Shareholders' Equity		
Current liabilities:		
Current installments of long-term debt	$ 26.3	$ 2.1
Accounts payable	729.2	651.9
Income taxes payable	10.7	19.8
Current operating lease liabilities	74.7	79.3
Accrued liabilities	358.0	329.1
Total current liabilities	1,198.9	1,082.2
Long-term debt	3,837.5	3,338.7
Operating lease liabilities	291.6	303.4
Accrued pension liability	733.3	797.7
Deferred income taxes	443.2	454.5
Other liabilities	315.6	793.8
Total liabilities	6,820.1	6,770.3
Commitments and contingencies		
Shareholders' equity:		
Common stock, $1.00 par value per share:		
Authorized, 240.0 shares; issued and outstanding, 158.0 and 157.7 shares	158.0	157.7
Additional paid-in capital	2,137.8	2,122.1
Accumulated other comprehensive loss	(689.9)	(803.4)
Retained earnings (accumulated deficit)	(155.1)	941.1
Total shareholders' equity	1,450.8	2,417.5
Total liabilities and shareholders' equity	$ 8,270.9	$ 9,187.8

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

CONSOLIDATED STATEMENTS OF OPERATIONS
Years ended December 31
(In millions, except per share data)

	2020	2019	2018
Sales	$ 5,758.0	$ 6,110.0	$ 6,946.1
Operating expenses:			
Cost of goods sold	5,374.6	5,439.2	5,822.1
Selling and administration	422.0	416.9	430.6
Restructuring charges	9.0	76.5	21.9
Acquisition-related costs	—	—	1.0
Goodwill impairment	699.8	—	—
Other operating income	0.7	0.4	6.4
Operating (loss) income	(746.7)	177.8	676.9
Losses of non-consolidated affiliates	—	—	(19.7)
Interest expense	292.7	243.2	243.2
Interest income	0.5	1.0	1.6
Non-operating pension income	18.9	16.3	21.7
Other income	—	11.2	—
Income (loss) before taxes	(1,020.0)	(36.9)	437.3
Income tax (benefit) provision	(50.1)	(25.6)	109.4
Net (loss) income	$ (969.9)	$ (11.3)	$ 327.9
Net (loss) income per common share:			
Basic	$ (6.14)	$ (0.07)	$ 1.97
Diluted	$ (6.14)	$ (0.07)	$ 1.95
Average common shares outstanding:			
Basic	157.9	162.3	166.8
Diluted	157.9	162.3	168.4

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

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
Years ended December 31
(In millions)

	2020	2019	2018
Net (loss) income	$ (969.9)	$ (11.3)	$ 327.9
Other comprehensive income (loss), net of tax:			
Foreign currency translation adjustments, net	27.8	(9.1)	(22.2)
Unrealized gains (losses) on derivative contracts, net	35.0	(15.4)	(11.7)
Pension and postretirement liability adjustments, net	14.8	(150.2)	(74.9)
Amortization of prior service costs and actuarial losses, net	35.9	22.3	28.3
Total other comprehensive income (loss), net of tax	113.5	(152.4)	(80.5)
Comprehensive (loss) income	$ (856.4)	$ (163.7)	$ 247.4

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

CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY
(In millions, except per share data)

	Common Stock					
	Shares Issued	*Par Value*	*Additional Paid-In Capital*	*Accumulated Other Comprehensive Loss*	*Retained Earnings (Accumulated Deficit)*	*Total Shareholders' Equity*
Balance at January 1, 2018	167.1	$ 167.1	$ 2,280.9	$ (484.6)	$ 790.3	$ 2,753.7
Income tax reclassification adjustment	—	—	—	(85.9)	85.9	—
Net income	—	—	—	—	327.9	327.9
Other comprehensive loss	—	—	—	(80.5)	—	(80.5)
Dividends paid:						
Common stock ($0.80 per share)	—	—	—	—	(133.6)	(133.6)
Common stock repurchased and retired	(2.1)	(2.1)	(47.9)	—	—	(50.0)
Common stock issued for:						
Stock options exercised	0.2	0.2	3.2	—	—	3.4
Other transactions	0.1	0.1	2.0	—	—	2.1
Stock-based compensation	—	—	9.2	—	—	9.2
Balance at December 31, 2018	165.3	$ 165.3	$ 2,247.4	$ (651.0)	$ 1,070.5	$ 2,832.2
Lease accounting adoption adjustment	—	—	—	—	11.2	11.2
Net loss	—	—	—	—	(11.3)	(11.3)
Other comprehensive loss	—	—	—	(152.4)	—	(152.4)
Dividends paid:						
Common stock ($0.80 per share)	—	—	—	—	(129.3)	(129.3)
Common stock repurchased and retired	(8.0)	(8.0)	(137.9)	—	—	(145.9)
Common stock issued for:						
Stock options exercised	0.1	0.1	1.6	—	—	1.7
Other transactions	0.3	0.3	2.8	—	—	3.1
Stock-based compensation	—	—	8.2	—	—	8.2
Balance at December 31, 2019	157.7	$ 157.7	$ 2,122.1	$ (803.4)	$ 941.1	$ 2,417.5
Net loss	—	—	—	—	(969.9)	(969.9)
Other comprehensive income	—	—	—	113.5	—	113.5
Dividends paid:						
Common stock ($0.80 per share)	—	—	—	—	(126.3)	(126.3)
Common stock issued for:						
Stock options exercised	0.1	0.1	1.8	—	—	1.9
Other transactions	0.2	0.2	3.6	—	—	3.8
Stock-based compensation	—	—	10.3	—	—	10.3
Balance at December 31, 2020	158.0	$ 158.0	$ 2,137.8	$ (689.9)	$ (155.1)	$ 1,450.8

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

CONSOLIDATED STATEMENTS OF CASH FLOWS
Years ended December 31
(In millions)

	2020	2019	2018
Operating Activities			
Net (loss) income	$ (969.9)	$ (11.3)	$ 327.9
Adjustments to reconcile net (loss) income to net cash and cash equivalents provided by (used for) operating activities:			
Goodwill impairment	699.8	—	—
Gain on disposition of non-consolidated affiliate	—	(11.2)	—
Losses of non-consolidated affiliates	—	—	19.7
Losses on disposition of property, plant and equipment	—	—	2.0
Stock-based compensation	13.6	10.7	12.0
Depreciation and amortization	568.4	597.4	601.4
Deferred income taxes	(18.4)	(45.5)	35.6
Write-off of equipment and facility included in restructuring charges	—	58.9	2.6
Qualified pension plan contributions	(2.1)	(14.9)	(2.6)
Qualified pension plan income	(11.4)	(9.3)	(15.0)
Change in assets and liabilities:			
Receivables	(0.3)	12.3	(46.3)
Income taxes receivable/payable	(11.2)	(10.7)	24.5
Inventories	28.6	13.0	(35.5)
Other current assets	(24.8)	7.4	0.2
Accounts payable and accrued liabilities	149.3	(11.0)	(14.5)
Other assets	(18.6)	(1.3)	(2.6)
Other noncurrent liabilities	12.8	30.5	4.3
Other operating activities	2.6	2.3	(5.9)
Net operating activities	418.4	617.3	907.8
Investing Activities			
Capital expenditures	(298.9)	(385.6)	(385.2)
Payments under ethylene long-term supply contracts	(461.0)	—	—
Payments under other long-term supply contracts	(75.8)	—	—
Proceeds from disposition of property, plant and equipment	—	—	2.9
Proceeds from disposition of non-consolidated affiliate	—	20.0	—
Net investing activities	(835.7)	(365.6)	(382.3)
Financing Activities			
Long-term debt:			
Borrowings	1,827.5	825.0	570.0
Repayments	(1,307.2)	(744.2)	(946.1)
Common stock repurchased and retired	—	(145.9)	(50.0)
Stock options exercised	1.9	1.7	3.4
Dividends paid	(126.3)	(129.3)	(133.6)
Debt issuance costs	(10.3)	(16.6)	(8.5)
Net financing activities	385.6	(209.3)	(564.8)
Effect of exchange rate changes on cash and cash equivalents	0.5	(0.3)	(0.3)
Net (decrease) increase in cash and cash equivalents	(31.2)	42.1	(39.6)
Cash and cash equivalents, beginning of year	220.9	178.8	218.4
Cash and cash equivalents, end of year	$ 189.7	$ 220.9	$ 178.8
Cash paid (received) for interest and income taxes:			
Interest, net	$ 286.4	$ 198.3	$ 208.8
Income taxes, net of refunds	$ (9.6)	$ 36.3	$ 52.9

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

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1. DESCRIPTION OF BUSINESS

Olin Corporation (Olin) is a Virginia corporation, incorporated in 1892, having its principal executive offices in Clayton, MO. We are a manufacturer concentrated in three business segments: Chlor Alkali Products and Vinyls, Epoxy and Winchester. The Chlor Alkali Products and Vinyls segment manufactures and sells chlorine and caustic soda, ethylene dichloride and vinyl chloride monomer, methyl chloride, methylene chloride, chloroform, carbon tetrachloride, perchloroethylene, trichloroethylene, hydrochloric acid, hydrogen, bleach products and potassium hydroxide. The Epoxy segment produces and sells a full range of epoxy materials and precursors, including aromatics (acetone, bisphenol, cumene and phenol), allyl chloride, epichlorohydrin, liquid epoxy resins, solid epoxy resins and downstream products such as converted epoxy resins and additives. The Winchester segment produces and sells sporting ammunition, reloading components, small caliber military ammunition and components, and industrial cartridges.

NOTE 2. ACCOUNTING POLICIES

The preparation of the consolidated financial statements requires estimates and assumptions that affect amounts reported and disclosed in the financial statements and related notes. Actual results could differ from those estimates.

Basis of Presentation

The consolidated financial statements include the accounts of Olin and all majority-owned subsidiaries. Investment in our affiliates are accounted for on the equity method. Accordingly, we include only our share of earnings or losses of these affiliates in consolidated net income (loss). Certain reclassifications were made to prior year amounts to conform to the 2020 presentation.

Revenue Recognition

We derive our revenues primarily from the manufacturing and delivery of goods to customers. Revenues are recognized on sales of goods at the time when control of those goods is transferred to our customers at an amount that reflects the consideration to which we expect to be entitled in exchange for those goods. We primarily sell our goods directly to customers, and to a lesser extent, through distributors. Payment terms are typically 30 to 90 days from date of invoice. Our contracts do not typically have a significant financing component. Right to payment is determined at the point in time in which control has transferred to the customer.

A performance obligation is a promise in a contract to transfer a distinct good to the customer. At contract inception, we assess the goods promised in our contracts with customers and identify a performance obligation for each promise to transfer to the customer a good (or bundle of goods) that is distinct. A contract's transaction price is based on the price stated in the contract and allocated to each distinct performance obligation and revenue is recognized when the performance obligation is satisfied. Substantially all of our contracts have a single distinct performance obligation or multiple performance obligations which are distinct and represent individual promises within the contract. Substantially all of our performance obligations are satisfied at a single point in time, when control is transferred, which is generally upon shipment or delivery as stated in the contract terms.

All taxes assessed by governmental authorities that are both imposed on and concurrent with our revenue-producing transactions and collected from our customers are excluded from the measurement of the transaction price. Shipping and handling fees billed to customers are included in revenue and are considered activities to fulfill the promise to transfer the good. Allowances for estimated returns, discounts and rebates are considered variable consideration, which may be constrained, and are estimated and recognized when sales are recorded. The estimates are based on various market data, historical trends and information from customers. Actual returns, discounts and rebates have not been materially different from estimates. For all contracts that have a duration of one year or less at contract inception, we do not adjust the promised amount of consideration for the effects of a significant financing component.

Substantially all of our revenue is derived from contracts with an original expected length of time of one year or less and for which we recognize revenue for the amount in which we have the right to invoice at the point in time in which control has transferred to the customer. However, a portion of our revenue is derived from long-term contracts which have contract periods that vary between one to multi-year. Certain of these contracts represent contracts with minimum purchase obligations, which can be substantially different than the actual revenue recognized. Such contracts consist of varying types of products across our chemical businesses. Certain contracts include variable volumes and/or variable pricing with pricing provisions tied to commodity, consumer price or other indices. The transaction price allocated to the remaining performance obligations related to our contracts was excluded from the disclosure of our remaining performance obligations based on the following practical expedients that we elected to apply: (i) contracts with index-based pricing or variable volume attributes in which such variable consideration is allocated entirely to a wholly unsatisfied performance obligation; and (ii) contracts with an original expected duration of one year or less.

Cost of Goods Sold and Selling and Administration Expenses

Cost of goods sold includes the costs of inventory sold, related purchasing, distribution and warehousing costs, costs incurred for shipping and handling, depreciation and amortization expense related to these activities and environmental remediation costs and recoveries. Selling and administration expenses include personnel costs associated with sales, marketing and administration, research and development, legal and legal-related costs, consulting and professional services fees, advertising expenses, depreciation expense related to these activities, foreign currency translation and other similar costs.

Acquisition-related Costs

Acquisition-related costs include advisory, legal, accounting and other professional fees incurred in connection with the purchase and integration of our acquisitions. Acquisition-related costs also may include costs which arise as a result of acquisitions, including contractual change in control provisions, contract termination costs, compensation payments related to the acquisition or pension and other postretirement benefit plan settlements. On October 5, 2015 (the Closing Date), we completed the acquisition (the Acquisition) from The Dow Chemical Company (Dow) of its U.S. Chlor Alkali and Vinyl, Global Chlorinated Organics and Global Epoxy businesses (collectively, the Acquired Business). For the year ended December 31, 2018, we incurred costs related to the integration of the Acquired Business of $1.0 million which consisted of advisory, legal, accounting and other professional fees.

Other Operating Income (Expense)

Other operating income (expense) consists of miscellaneous operating income items, which are related to our business activities, and gains (losses) on disposition of property, plant and equipment.

Included in other operating income were the following:

	Years Ended December 31,		
	2020	***2019***	***2018***
		($ in millions)	
Losses on disposition of property, plant and equipment, net	$ (0.2)	$ —	$ (2.0)
Gains on insurance recoveries	—	—	8.0
Other	0.9	0.4	0.4
Other operating income	$ 0.7	$ 0.4	$ 6.4

Other operating income for 2020 included an $0.8 million gain on the sale of land. Other operating income for 2018 included an $8.0 million insurance recovery for a second quarter 2017 business interruption at our Freeport, TX vinyl chloride monomer facility partially offset by a $1.7 million loss on the sale of land.

Other Income (Expense)

Other income (expense) consists of non-operating income and expense items which are not related to our primary business activities.

Foreign Currency Translation

Our worldwide operations utilize the U.S. dollar (USD) or local currency as the functional currency, where applicable. For foreign entities where the USD is the functional currency, gains and losses resulting from balance sheet translations are included in selling and administration. For foreign entities where the local currency is the functional currency, assets and liabilities denominated in local currencies are translated into USD at end-of-period exchange rates and the resultant translation adjustments are included in accumulated other comprehensive loss. Assets and liabilities denominated in other than the local currency are remeasured into the local currency prior to translation into USD and the resultant exchange gains or losses are included in income in the period in which they occur. Income and expenses are translated into USD using an approximation of the average rate prevailing during the period. We change the functional currency of our separate and distinct foreign entities only when significant changes in economic facts and circumstances indicate clearly that the functional currency has changed.

Cash and Cash Equivalents

All highly liquid investments, with a maturity of three months or less at the date of purchase, are considered to be cash equivalents.

Short-Term Investments

We classify our marketable securities as available-for-sale, which are reported at fair market value with unrealized gains and losses included in accumulated other comprehensive loss, net of applicable taxes. The fair value of marketable securities is determined by quoted market prices. Realized gains and losses on sales of investments, as determined on the specific identification method, and declines in value of securities judged to be other-than-temporary are included in other income (expense) in the consolidated statements of operations. Interest and dividends on all securities are included in interest income and other income (expense), respectively. As of December 31, 2020 and 2019, we had no short-term investments recorded on our consolidated balance sheets.

Allowance for Doubtful Accounts Receivable

We evaluate the collectibility of financial instruments based on our current estimate of credit losses expected to be incurred over the life of the financial instrument. The only significant financial instrument which creates exposure to credit losses are customer accounts receivables. We measure credit losses on uncollected accounts receivable through an allowance for doubtful accounts receivable which is based on a combination of factors including both historical collection experience and reasonable estimates that affect the expected collectibility of the receivable. These factors include historical bad debt experience, industry conditions of the customer or group of customers, geographical region, credit ratings and general market conditions. We group receivables together for purposes of estimating credit losses when customers have similar risk characteristics; otherwise, the estimation is performed on the individual receivable.

This estimate is periodically adjusted when we become aware of a specific customer's inability to meet its financial obligations (e.g., bankruptcy filing) or as a result of changes in the overall aging of accounts receivable. While we have a large number of customers that operate in diverse businesses and are geographically dispersed, a general economic downturn in any of the industry segments in which we operate could result in higher than expected defaults, and, therefore, the need to revise estimates for the provision for doubtful accounts could occur.

Inventories

Inventories are valued at the lower of cost and net realizable value. For U.S. inventories, inventory costs are determined principally by the last-in, first-out (LIFO) method of inventory accounting while for international inventories, inventory costs are determined principally by the first-in, first-out (FIFO) method of inventory accounting. Costs for other inventories have been determined principally by the average-cost method (primarily operating supplies, spare parts and maintenance parts). Elements of costs in inventories include raw materials, direct labor and manufacturing overhead.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. Depreciation is computed on a straight-line basis over the estimated useful lives of the related assets. Interest costs incurred to finance expenditures for major long-term construction projects are capitalized as part of the historical cost and included in property, plant and equipment and are depreciated over the useful lives of the related assets. Leasehold improvements are amortized over the term of the lease or the estimated useful life of the improvement, whichever is shorter. Start-up costs are expensed as incurred. Expenditures for maintenance and repairs are charged to expense when incurred while the costs of significant improvements, which extend the useful life of the underlying asset, are capitalized.

Property, plant and equipment are reviewed for impairment when conditions indicate that the carrying values of the assets may not be recoverable. Such impairment conditions include an extended period of idleness or a plan of disposal. If such impairment indicators are present or other factors exist that indicate that the carrying amount of an asset may not be recoverable, we determine whether impairment has occurred through the use of an undiscounted cash flow analysis at the lowest level for which identifiable cash flows exist. For our Chlor Alkali Products and Vinyls, Epoxy and Winchester segments, the lowest level for which identifiable cash flows exist is the operating facility level or an appropriate grouping of operating facilities level. The amount of impairment loss, if any, is measured by the difference between the net book value of the assets and the estimated fair value of the related assets.

Leases

In February 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-02 "Leases," (ASU 2016-02) which supersedes Accounting Standards Codification (ASC) 840 "Leases" and creates a new topic, ASC 842 "Leases" (ASC 842). Subsequent to the issuance of ASU 2016-02, ASC 842 was amended by various updates that amend and clarify the impact and implementation of the aforementioned update. Upon initial application, the provisions of these updates are required to be applied using the modified retrospective method which requires retrospective adoption to each prior reporting period presented with the cumulative effect of adoption recorded to the earliest reporting period presented. An optional transition method can be utilized which requires application of these updates beginning on the date of adoption with the cumulative effect of initially applying these updates recognized at the date of initial adoption. We adopted these updates on January 1, 2019 using the optional transition method. Consequently, our comparative periods have not been retrospectively adjusted for the new lease requirements. In addition, we elected the following practical expedients:

- We elected the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allowed us to carry forward the historical lease classification.
- We elected the practical expedient related to land easements, allowing us to carry forward our accounting treatment for land easements on existing agreements.
- We elected the short-term practical expedient for all classes of lease assets, which allows us to not record leases with an initial term of 12 months or less on the balance sheet, and instead recognize the expense straight-line over the lease term.
- We elected the practical expedient to not separate lease components from non-lease components for all asset classes.

Adoption of these updates resulted in the recording of operating lease assets and lease liabilities on our consolidated balance sheet of $291.9 million as of January 1, 2019. Our assets and liabilities for finance leases remained unchanged. We also recognized the cumulative effect of applying these updates as an adjustment to retained earnings of $11.2 million, net of tax, which was primarily related to the recognition of previously deferred sale/leaseback gains. Our consolidated statements of operations and cash flows, along with our compliance with all covenants and restrictions under all our outstanding credit agreements, were not impacted by this adoption.

We determine if an arrangement is a lease at inception of the contract. Operating lease assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. Operating lease assets and liabilities are recognized at commencement date based on the present value of fixed lease payments over the lease term. Our lease commitments are primarily for railcars, but also include logistics, manufacturing, storage, real estate and information technology assets. Leases with an initial term of 12 months or less are not recorded on the balance sheet; instead, we recognize lease expense for these leases on a straight-line basis over the lease term. We do not account for lease components (e.g., fixed payments to use the underlying lease asset) separately from the non-lease components (e.g., fixed payments for common-area maintenance costs and other items that transfer a good or service). Some of our leases include variable lease payments, which primarily result from changes in consumer price and other market-based indices, which are generally updated annually, and maintenance and usage charges. These variable payments are excluded from the calculation of our lease assets and liabilities.

Most leases include one or more options to renew, with renewal terms that can extend the lease term from one to many years. The exercise of lease renewal options is typically at our sole discretion. Certain leases also include options to purchase the leased asset. We do not include options to renew or purchase leased assets in the measurement of lease liabilities unless those options are highly certain of exercise. The depreciable life of assets and leasehold improvements are limited by the expected lease term, unless there is a transfer of title or purchase option reasonably certain of exercise. We have operating leases with terms that require us to guarantee a portion of the residual value of the leased assets upon termination of the lease as well as other guarantees. These residual value guarantees consist primarily of leases for railcars. Residual value guarantee payments that become probable and estimable are accrued as part of the lease liability and recognized over the remaining life of the applicable lease. Our current expectation is that the likelihood of material residual guarantee payments is remote. We utilize the interest rate implicit in the lease to determine the lease liability when the interest rate can be determined. As most of our leases do not provide an implicit rate, we use our incremental borrowing rate based on the information available at the lease commencement date in determining the present value of lease payments. We estimate the incremental borrowing rate based on the geographic region for which we would borrow, on a secured basis of the lease asset, at an amount equal to the lease payments over a similar time period as the lease term. We have no additional restrictions or covenants imposed by our lease contracts.

Asset Retirement Obligations

We record the fair value of an asset retirement obligation associated with the retirement of a tangible long-lived asset as a liability in the period incurred. The liability is measured at discounted fair value and is adjusted to its present value in subsequent periods as accretion expense is recorded. The corresponding asset retirement costs are capitalized as part of the carrying amount of the related long-lived asset and depreciated over the asset's useful life. Asset retirement obligations are reviewed annually in the fourth quarter and/or when circumstances or other events indicate that changes underlying retirement assumptions may have occurred.

The activities of our asset retirement obligations were as follows:

	December 31,	
	2020	2019
	($ in millions)	
Beginning balance	$ 63.7	$ 60.2
Accretion	3.4	3.4
Spending	(4.1)	(4.5)
Foreign currency translation adjustments	0.1	0.1
Adjustments	1.9	4.5
Ending balance	$ 65.0	$ 63.7

At December 31, 2020 and 2019, our consolidated balance sheets included an asset retirement obligation of $47.0 million and $53.4 million, respectively, which were classified as other noncurrent liabilities.

In 2020 and 2019, we had net adjustments that increased the asset retirement obligation by $1.9 million and $4.5 million, respectively, which were primarily comprised of increases in estimated costs for certain assets.

Comprehensive Income (Loss)

Accumulated other comprehensive loss consists of foreign currency translation adjustments, pension and postretirement liability adjustments, pension and postretirement amortization of prior service costs and actuarial losses and net unrealized (losses) gains on derivative contracts.

Goodwill

Goodwill is not amortized, but is reviewed for impairment annually in the fourth quarter and/or when circumstances or other events indicate that impairment may have occurred. ASC 350 "Intangibles—Goodwill and Other" (ASC 350) permits entities to make a qualitative assessment of whether it is more likely than not that a reporting unit's fair value is less than its carrying amount before applying the goodwill impairment test. Circumstances that are considered as part of the qualitative assessment and could trigger a quantitative impairment test include, but are not limited to: a significant adverse change in the business climate; a significant adverse legal judgment; adverse cash flow trends; an adverse action or assessment by a government agency; unanticipated competition; sustained decline in our stock price; and a significant restructuring charge within a reporting unit. We define reporting units at the business segment level or one level below the business segment level. For purposes of testing goodwill for impairment, goodwill has been allocated to our reporting units to the extent it relates to each reporting unit.

It is our practice, at a minimum, to perform a quantitative goodwill impairment test in the fourth quarter every three years. We use a discounted cash flow approach to develop the estimated fair value of a reporting unit when a quantitative test is performed. Management judgment is required in developing the assumptions for the discounted cash flow model. We also corroborate our discounted cash flow analysis by evaluating a market-based approach that considers earnings before interest, taxes, depreciation and amortization (EBITDA) multiples from a representative sample of comparable public companies. As a further indicator that each reporting unit has been valued appropriately using a discounted cash flow model, the aggregate fair value of all reporting units is reconciled to the total market value of Olin. An impairment would be recorded if the carrying amount of a reporting unit exceeded the estimated fair value. See Note 11 "Goodwill and Intangible Assets" for additional information.

Intangible Assets

In conjunction with our acquisitions, we have obtained access to the customer contracts and relationships, trade names, acquired technology and other intellectual property of the acquired companies. These relationships are expected to provide economic benefit for future periods. Amortization expense is recognized on a straight-line basis over the estimated lives of the related assets. The amortization period of customer contracts and relationships, trade names, acquired technology and other intellectual property represents our best estimate of the expected usage or consumption of the economic benefits of the acquired assets, which is based on the company's historical experience.

Intangible assets with finite lives are reviewed for impairment when conditions indicate that the carrying values of the assets may not be recoverable. Circumstances that are considered as part of the qualitative assessment and could trigger a quantitative impairment test include, but are not limited to: a significant adverse change in the business climate; a significant adverse legal judgment including asset specific factors; adverse cash flow trends; an adverse action or assessment by a government agency; unanticipated competition; sustained decline in our stock price; and a significant restructuring charge within a reporting unit. Based upon our qualitative assessment, it is more likely than not that the fair value of our intangible assets are greater than the carrying amount as of December 31, 2020. No impairment of our intangible assets were recorded in 2020, 2019 or 2018.

Environmental Liabilities and Expenditures

Accruals (charges to income) 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, based upon current law and existing technologies. These amounts, which are not discounted and are exclusive of claims against third parties, are adjusted periodically as assessment and remediation efforts progress or additional technical or legal information becomes available. Environmental costs are capitalized if the costs increase the value of the property and/or mitigate or prevent contamination from future operations.

Income Taxes

Deferred taxes are provided for differences between the financial statement and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. A valuation allowance is provided to offset deferred tax assets if, based on the available evidence, it is more likely than not that some or all of the value of the deferred tax assets will not be realized.

Derivative Financial Instruments

We are exposed to market risk in the normal course of our business operations due to our purchases of certain commodities, our ongoing investing and financing activities and our operations that use foreign currencies. The risk of loss can be assessed from the perspective of adverse changes in fair values, cash flows and future earnings. We have established policies and procedures governing our management of market risks and the use of financial instruments to manage exposure to such risks. We use hedge accounting treatment for a significant amount of our business transactions whose risks are covered using derivative instruments. The hedge accounting treatment provides for the deferral of gains or losses on derivative instruments until such time as the related transactions occur.

Concentration of Credit Risk

Accounts receivable is the principal financial instrument which subjects us to a concentration of credit risk. Credit is extended based upon the evaluation of a customer's financial condition and, generally, collateral is not required. Concentrations of credit risk with respect to receivables are somewhat limited due to our large number of customers, the diversity of these customers' businesses and the geographic dispersion of such customers. Our accounts receivable are predominantly derived from sales denominated in USD or the Euro. We maintain an allowance for doubtful accounts based upon the expected collectibility of all trade receivables.

Fair Value

Fair value is defined as the price at which an asset could be exchanged in a current transaction between knowledgeable, willing parties or the amount that would be paid to transfer a liability to a new obligor, not the amount that would be paid to settle the liability with the creditor. Where available, fair value is based on observable market prices or parameters or derived from such prices or parameters. Where observable prices or inputs are not available, valuation models are applied. These valuation techniques involve some level of management estimation and judgment, the degree of which is dependent on the price transparency for the instruments or market and the instruments' complexity.

Assets and liabilities recorded at fair value in the consolidated balance sheets are categorized based upon the level of judgment associated with the inputs used to measure their fair value. Hierarchical levels, defined by ASC 820 "Fair Value Measurement" (ASC 820), and directly related to the amount of subjectivity associated with the inputs to fair valuation of these assets and liabilities, are as follows:

Level 1 — Inputs were unadjusted, quoted prices in active markets for identical assets or liabilities at the measurement date.

Level 2 — Inputs (other than quoted prices included in Level 1) were either directly or indirectly observable for the asset or liability through correlation with market data at the measurement date and for the duration of the instrument's anticipated life.

Level 3 — Inputs reflected management's best estimate of what market participants would use in pricing the asset or liability at the measurement date. Consideration was given to the risk inherent in the valuation technique and the risk inherent in the inputs to the model.

Retirement-Related Benefits

We account for our defined benefit pension plans and non-pension postretirement benefit plans using actuarial models required by ASC 715 "Compensation—Retirement Benefits" (ASC 715). These models use an attribution approach that generally spreads the financial impact of changes to the plan and actuarial assumptions over the average remaining service lives of the employees in the plan. Changes in liability due to changes in actuarial assumptions such as discount rate, rate of compensation increases and mortality, as well as annual deviations between what was assumed and what was experienced by the plan are treated as actuarial gains or losses. The principle underlying the required attribution approach is that employees render service over their average remaining service lives on a relatively smooth basis and, therefore, the accounting for benefits earned under the pension or non-pension postretirement benefits plans should follow the same relatively smooth pattern. Substantially all domestic defined benefit pension plan participants are no longer accruing benefits; therefore, actuarial gains and losses are amortized based upon the remaining life expectancy of the inactive plan participants. For both the years ended December 31, 2020 and 2019, the average remaining life expectancy of the inactive participants in the domestic defined benefit pension plan were 18 years, respectively.

One of the key assumptions for the net periodic pension calculation is the expected long-term rate of return on plan assets, used to determine the "market-related value of assets." The "market-related value of assets" recognizes differences between the plan's actual return and expected return over a five year period. The required use of an expected long-term rate of return on the market-related value of plan assets may result in recognized pension income that is greater or less than the actual returns of those plan assets in any given year. Over time, however, the expected long-term returns are designed to approximate the actual long-term returns and, therefore, result in a pattern of income and expense recognition that more closely matches the pattern of the services provided by the employees. As differences between actual and expected returns are recognized over five years, they subsequently generate gains and losses that are subject to amortization over the average remaining life expectancy of the inactive plan participants, as described in the preceding paragraph.

We use long-term historical actual return information, the mix of investments that comprise plan assets, and future estimates of long-term investment returns and inflation by reference to external sources to develop the expected long-term rate of return on plan assets as of December 31.

The discount rate assumptions used for pension and non-pension postretirement benefit plan accounting reflect the rates available on high-quality fixed-income debt instruments on December 31 of each year. The rate of compensation increase is based upon our long-term plans for such increases. For retiree medical plan accounting, we review external data and our own historical trends for healthcare costs to determine the healthcare cost trend rates.

For our defined benefit pension and other postretirement benefit plans, we measure service and interest costs by applying the specific spot rates along the yield curve to the plans' estimated cash flows. We believe this approach provides a more precise measurement of service and interest costs by aligning the timing of the plans' liability cash flows to the corresponding spot rates on the yield curve.

Stock-Based Compensation

We measure the cost of employee services received in exchange for an award of equity instruments, such as stock options, performance shares and restricted stock, based on the grant-date fair value of the award. This cost is recognized over the period during which an employee is required to provide service in exchange for the award, the requisite service period (usually the vesting period). An initial measurement is made of the cost of employee services received in exchange for an award of liability instruments based on its current fair value and the value of that award is subsequently remeasured at each reporting date through the settlement date. Changes in fair value of liability awards during the requisite service period are recognized as compensation cost over that period.

The fair value of each option granted, which typically vests ratably over three years, but not less than one year, was estimated on the date of grant, using the Black-Scholes option-pricing model with the following assumptions:

	2020	***2019***	***2018***
Dividend yield	4.60 %	3.05 %	2.43 %
Risk-free interest rate	1.44 %	2.51 %	2.72 %
Expected volatility	36 %	34 %	32 %
Expected life (years)	6.0	6.0	6.0
Weighted-average grant fair value (per option)	$ 3.64	$ 6.76	$ 8.89
Weighted-average exercise price	$ 17.33	$ 26.26	$ 32.94
Shares granted	2,663,100	1,578,200	927,000

Dividend yield was based on our current dividend yield as of the option grant date. Risk-free interest rate was based on zero coupon U.S. Treasury securities rates for the expected life of the options. Expected volatility was based on our historical stock price movements, as we believe that historical experience is the best available indicator of the expected volatility. Expected life of the option grant was based on historical exercise and cancellation patterns, as we believe that historical experience is the best estimate for future exercise patterns.

Share Repurchases

On April 26, 2018, our board of directors authorized a share repurchase program for the purchase of shares of common stock at an aggregate price of up to $500.0 million. This program will terminate upon the purchase of $500.0 million of our common stock. Under our April 26, 2018 share repurchase program, we may pursue various share repurchase strategies, which include entering into accelerated share repurchase (ASR) agreements with third-party financial institutions to repurchase shares of Olin's common stock. Under an ASR agreement, Olin pays a specified amount to the financial institution and receives an initial delivery of shares. This initial delivery of shares represents the minimum number of shares that Olin may receive under the agreement. Upon settlement of the ASR agreement, the financial institution delivers additional shares, with the final number of shares delivered determined with reference to the volume weighted-average price of Olin's common stock over the term of the agreement, less an agreed-upon discount. The transactions are accounted for as liability or equity transactions and also as share retirements, similar to our other share repurchase activity, when the shares are received, at which time there is an immediate reduction in the weighted-average common shares calculation for basic and diluted earnings per share.

NOTE 3. RECENT ACCOUNTING PRONOUNCEMENTS

In March 2020, the U.S. Securities and Exchange Commission issued final rule 33-10762, "Financial Disclosures About Guarantors and Issuers of Guaranteed Securities and Affiliates Whose Securities Collateralize a Registrant's Securities." In October 2020, the FASB issued ASU 2020-09, "Amendments Pursuant to SEC Release No. 33-10762," which amends ASC 470, "Debt" for this rule. This rule simplifies the disclosure requirements related to registered securities under Rule 3-10 of Regulation S-X by modifying criteria to qualify for an exception to the requirement that an entity file separate financial statements for subsidiary issuers and guarantors. The rule also reduces and, in some cases, eliminates the disclosures an entity must provide in lieu of the subsidiary's audited financial statements and allows disclosures to be summarized and included within Management's Discussion and Analysis of Financial Condition and Results of Operations. The rule requires certain enhanced narrative disclosures, including the terms and conditions of the guarantees and how the legal obligations of the issuer and guarantor, as well as other factors, may affect payments to holders of the debt securities. The final rule is effective on January 4, 2021, with earlier application permitted. We adopted the provisions of this rule during the third quarter of 2020 which did not have a material impact on our consolidated financial statements. The adoption of this rule resulted in summarizing our supplemental guarantor financial information in Management's Discussion and Analysis of Financial Condition and Results of Operations.

In March 2020, the FASB issued ASU 2020-04, "Facilitation of the Effects of Reference Rate Reform on Financial Reporting" (ASU 2020-04) which creates a new topic, ASC 848 "Reference Rate Reform" (ASC 848). Subsequent to the issuance of ASU 2020-04, ASC 848 was amended by ASU 2021-01, "Scope" which amended and clarified the application and scope aforementioned update. This update provides optional guidance to ease the potential accounting burden associated with transition away from reference rates that are expected to be discontinued at the end of 2021, at which time financial institutions will no longer be required to report information that is currently used to determine the London Interbank Offered Rate (LIBOR) and other reference rates. This update allows companies to treat contract amendments to existing contracts for the purpose of establishing a new reference rate as continuations of those contracts without additional analysis, as long as the modification was made to establish a new reference rate. This update applies prospectively to contract modifications. The optional guidance was effective on March 12, 2020 and can be adopted beginning January 1, 2020 or any date thereafter until December 31, 2022, at which time the optional guidance can no longer be applied to contract amendments to existing contracts. We adopted the provisions of this update on January 1, 2020 and will apply this guidance prospectively to contract modifications that are entered into for the purpose of establishing a new reference rate. We are currently evaluating the prospective impact on our consolidated financial statements; however, for the year ended December 31, 2020, the adoption of this update did not have a material impact on our consolidated financial statements.

In December 2019, the FASB issued ASU 2019-12, "Simplifying the Accounting for Income Taxes" which amends ASC 740 "Income Taxes" (ASC 740). This update is intended to simplify accounting for income taxes by removing certain exceptions to the general principles in ASC 740 and amending existing guidance to improve consistent application of ASC 740. This update is effective for fiscal years beginning after December 15, 2020 and interim periods within those fiscal years. The guidance in this update has various elements, some of which are applied on a prospective basis and others on a retrospective basis with earlier application permitted. We adopted this update on January 1, 2020 which did not have a material impact on our consolidated financial statements.

In January 2017, the FASB issued ASU 2017-04, "Simplifying the Test for Goodwill Impairment" which amended ASC 350. This update simplifies the measurement of goodwill impairment by eliminating Step 2 from the goodwill impairment test. This update requires an entity to perform its annual, or interim, goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount and recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value. The update did not modify the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. This update is effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years. The guidance in this update is applied on a prospective basis, with earlier application permitted. We adopted this update on January 1, 2020, see Note 11 "Goodwill and Intangible Assets" for additional information.

In June 2016, the FASB issued ASU 2016-13, "Measurement of Credit Losses on Financial Instruments," (ASU 2016-03) which amends ASC 326 "Financial Instruments—Credit Losses" (ASC 326). Subsequent to the issuance of ASU 2016-13, ASC 326 was amended by various updates that amend and clarify the impact and implementation of the aforementioned update. The new guidance introduces the current expected credit loss (CECL) model, which will require an entity to record an allowance for credit losses for certain financial instruments and financial assets, including trade receivables, based on expected losses rather than incurred losses. Under this update, on initial recognition and at each reporting period, an entity will be required to recognize an allowance that reflects the entity's current estimate of credit losses expected to be incurred over the life of the financial instrument. This update is effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years. The guidance in this update has various elements, some of which are applied on a prospective basis and others on a retrospective basis, with earlier application permitted. We adopted this update on January 1, 2020 which did not have a material impact on our consolidated financial statements and related disclosures.

In February 2016, the FASB issued ASU 2016-02 "Leases," (ASU 2016-02) which supersedes ASC 840 "Leases" and creates a new topic, ASC 842 "Leases" (ASC 842). Subsequent to the issuance of ASU 2016-02, ASC 842 was amended by various updates that amend and clarify the impact and implementation of the aforementioned update. These updates require lessees to recognize a lease liability and a lease asset for all leases, including operating leases, with a term greater than 12 months on its balance sheet. Upon initial application, the provisions of these updates are required to be applied using the modified retrospective method which requires retrospective adoption to each prior reporting period presented with the cumulative effect of adoption recorded to the earliest reporting period presented. An optional transition method can be utilized which requires application of these updates beginning on the date of adoption with the cumulative effect of initially applying these updates recognized at the date of initial adoption. These updates also expand the required quantitative and qualitative disclosures surrounding leases. These updates are effective for fiscal years beginning after December 15, 2018 and interim periods within those fiscal years, with earlier application permitted. We adopted these updates on January 1, 2019 using the optional transition method. Accordingly, prior periods were not retrospectively adjusted. Adoption of these updates resulted in the recording of operating lease assets and lease liabilities on our consolidated balance sheet of $291.9 million as of January 1, 2019. Our assets and liabilities for finance leases remained unchanged. We also recognized the cumulative effect of applying these updates as an adjustment to retained earnings of $11.2 million, net of tax, which was primarily related to the recognition of previously deferred sale/leaseback gains. Our consolidated statements of operations and cash flows, along with our compliance with all covenants and restrictions under all our outstanding credit agreements, were not impacted by this adoption. These updates also impacted our accounting policies, internal controls and disclosures related to leases. Expanded disclosures regarding leases are included in Note 22 "Leases".

NOTE 4. RESTRUCTURING CHARGES

On December 11, 2019, we announced that we had made the decision to permanently close a chlor alkali plant with a capacity of 230,000 tons and our VDC production facility, both in Freeport, TX. The VDC facility was closed during the fourth quarter of 2020. The related chlor alkali plant closure is expected to be completed in the second quarter of 2021. For the year ended December 31, 2020, we recorded pretax restructuring charges of $3.8 million for facility exit costs and employee severance and related benefit costs related to these actions. For the year ended December 31, 2019, we recorded pretax restructuring charges of $58.9 million for non-cash impairment of equipment and facilities related to these actions. We expect to incur additional restructuring charges through 2025 of approximately $45 million related to these actions.

On December 10, 2018, we announced that we had made the decision to permanently close the ammunition assembly operations at our Winchester facility in Geelong, Australia. Subsequent to the facility's closure, products for customers in the region are sourced from Winchester manufacturing facilities located in the United States. For the years ended December 31, 2019 and 2018, we recorded pretax restructuring charges of $0.4 million and $4.1 million, respectively for the write-off of equipment and facility costs, employee severance and related benefit costs, lease and other contract termination costs and facility exit costs related to this action. For the year ended December 31, 2019, we also recorded additional pretax restructuring charges of $1.4 million for employee severance and related benefit costs related to our Winchester operations.

On March 21, 2016, we announced that we had made the decision to close a combined total of 433,000 tons of chlor alkali capacity across three separate locations. Associated with this action, we have permanently closed our Henderson, NV chlor alkali plant with 153,000 tons of capacity and have reconfigured the site to manufacture bleach and distribute caustic soda and hydrochloric acid. Also, the capacity of our Niagara Falls, NY chlor alkali plant has been reduced from 300,000 tons to 240,000 tons and the chlor alkali capacity at our Freeport, TX facility was reduced by 220,000 tons. This 220,000 ton reduction was entirely from diaphragm cell capacity. For the years ended December 31, 2020, 2019 and 2018, we recorded pretax restructuring charges of $5.2 million, $15.8 million and $15.7 million, respectively, for the lease and other contract termination costs, employee severance and related benefit costs and facility exit costs related to these actions. We expect to incur additional restructuring charges through 2021 of approximately $2 million related to these capacity reductions.

For the year ended December 31, 2018, we recorded pretax restructuring charges of $2.1 million for lease and other contract termination costs and facility exit costs related to our permanent reduction in capacity at our Becancour, Canada chlor alkali facility in 2014.

The following table summarizes the 2020, 2019 and 2018 activities by major component of these restructuring actions and the remaining balances of accrued restructuring costs as of December 31, 2020, 2019 and 2018:

	Employee severance and related benefit costs	*Lease and other contract termination costs*	*Facility exit costs*	*Write-off of equipment and facility*	*Total*
			($ in millions)		
Balance at January 1, 2018	$ 1.8	$ 3.3	$ —	$ —	$ 5.1
Restructuring charges	1.7	5.6	12.0	2.6	21.9
Amounts utilized	(2.0)	(2.9)	(11.3)	(2.6)	(18.8)
Balance at December 31, 2018	1.5	6.0	0.7	—	8.2
Restructuring charges	2.1	0.9	14.6	58.9	76.5
Amounts utilized	(3.6)	(3.8)	(15.3)	(58.9)	(81.6)
Balance at December 31, 2019	—	3.1	—	—	3.1
Restructuring charges	2.2	1.4	5.4	—	9.0
Amounts utilized	(0.4)	(2.8)	(5.4)	—	(8.6)
Balance at December 31, 2020	$ 1.8	$ 1.7	$ —	$ —	$ 3.5

The following table summarizes the cumulative restructuring charges of these restructuring actions by major component through December 31, 2020:

	Chlor Alkali Products and Vinyls				
	Becancour	Capacity Reductions	Freeport	Winchester	Total
			($ in millions)		
Write-off of equipment and facility	$ 3.5	$ 78.1	$ 58.9	$ 2.6	$ 143.1
Employee severance and related benefit costs	2.7	6.7	2.1	2.7	14.2
Facility exit costs	5.9	52.0	1.7	0.2	59.8
Employee relocation costs	—	1.7	—	—	1.7
Lease and other contract termination costs	6.1	42.2	—	0.4	48.7
Total cumulative restructuring charges	$ 18.2	$ 180.7	$ 62.7	$ 5.9	$ 267.5

As of December 31, 2020, we have incurred cash expenditures of $120.5 million and non-cash charges of $143.5 million related to these restructuring actions. The remaining balance of $3.5 million is expected to be paid out through 2022.

Subsequent Event

On January 18, 2021, we announced we had made the decision to permanently close our trichloroethylene and anhydrous hydrogen chloride liquefaction facilities in Freeport, TX, before the end of 2021. We expect to incur restructuring charges through 2023 of approximately $23 million related to these actions, approximately $2 million of which is expected to be incurred in 2021. These restructuring costs are expected to consist of $21 million of facility exit costs and $2 million of contract termination costs.

NOTE 5. EARNINGS PER SHARE

Basic and diluted net (loss) income per share are computed by dividing net (loss) income by the weighted-average number of common shares outstanding. Diluted net (loss) income per share reflects the dilutive effect of stock-based compensation.

	Years ended December 31,		
	2020	2019	2018
Computation of Net (Loss) Income per Share		(In millions, except per share data)	
Net (loss) income	$ (969.9)	$ (11.3)	$ 327.9
Basic shares	157.9	162.3	166.8
Basic net (loss) income per share	$ (6.14)	$ (0.07)	$ 1.97
Diluted shares:			
Basic shares	157.9	162.3	166.8
Stock-based compensation	—	—	1.6
Diluted shares	157.9	162.3	168.4
Diluted net (loss) income per share	$ (6.14)	$ (0.07)	$ 1.95

The computation of dilutive shares from stock-based compensation does not include 10.0 million, 7.8 million and 2.4 million shares in 2020, 2019 and 2018, respectively, as their effect would have been anti-dilutive.

NOTE 6. ACCOUNTS RECEIVABLES

On July 16, 2019, our existing $250.0 million Receivables Financing Agreement was extended to July 15, 2022 and downsized to $10.0 million with the option to expand (Receivables Financing Agreement). In 2020, we amended the Receivables Financing Agreement to expand the borrowing capacity to $250.0 million. The Receivables Financing Agreement includes a minimum borrowing requirement of 50% of the facility limit or available borrowing capacity, whichever is lesser. The administrative agent for our Receivables Financing Agreement is PNC Bank, National Association. Under the Receivables Financing Agreement, our eligible trade receivables are used for collateralized borrowings and continue to be serviced by us. In addition, the Receivables Financing Agreement incorporates the secured leverage covenant that is contained in the $1,300.0 million senior secured credit facility. For the year ended December 31, 2019, the outstanding balance of the $250.0 million Receivables Financing Agreement of $150.0 million was repaid with proceeds from the issuance of $750.0 million senior notes due 2029. As of December 31, 2020 and 2019, we had $125.0 million and zero, respectively, drawn under the agreement. As of December 31, 2020, $332.8 million of our trade receivables were pledged as collateral. As of December 31, 2020, we had $124.0 million of additional borrowing capacity under the Receivables Financing Agreement.

Olin also has trade accounts receivable factoring arrangements (AR Facilities) and pursuant to the terms of the AR Facilities, certain of our subsidiaries may sell their accounts receivable up to a maximum of $228.0 million. We will continue to service the outstanding accounts sold. These receivables qualify for sales treatment under ASC 860 "Transfers and Servicing" and, accordingly, the proceeds are included in net cash provided by operating activities in the consolidated statements of cash flows. The following table summarizes the AR Facilities activity:

	December 31,	
	2020	2019
	($ in millions)	
Beginning Balance	$ 63.1	$ 132.4
Gross receivables sold	854.3	984.8
Payments received from customers on sold accounts	(868.6)	(1,054.1)
Ending Balance	$ 48.8	$ 63.1

The factoring discount paid under the AR Facilities is recorded as interest expense on the consolidated statements of operations. The factoring discount for the years ended December 31, 2020, 2019 and 2018 was $1.5 million, $2.9 million and $4.3 million, respectively. The agreements are without recourse and therefore no recourse liability has been recorded as of December 31, 2020.

At December 31, 2020 and 2019, our consolidated balance sheets included other receivables of $62.4 million and $87.4 million, respectively, which were classified as receivables, net.

NOTE 7. ALLOWANCE FOR DOUBTFUL ACCOUNTS RECEIVABLES

Allowance for doubtful accounts receivable consisted of the following:

	December 31,	
	2020	2019
	($ in millions)	
Beginning balance	$ 11.9	$ 12.9
Provisions charged	0.7	1.1
Write-offs, net of recoveries	(0.5)	(2.1)
Foreign currency translation adjustments	0.2	—
Ending balance	$ 12.3	$ 11.9

NOTE 8. INVENTORIES

	December 31, 2020	December 31, 2019
	($ in millions)	
Supplies	$ 113.8	$ 105.6
Raw materials	116.3	69.2
Work in process	133.2	120.9
Finished goods	359.6	449.5
	722.9	745.2
LIFO reserve	(48.2)	(49.5)
Inventories, net	$ 674.7	$ 695.7

Inventories valued using the LIFO method comprised 51% and 56% of the total inventories at December 31, 2020 and 2019, respectively. The replacement cost of our inventories would have been approximately $48.2 million and $49.5 million higher than that reported at December 31, 2020 and 2019, respectively.

NOTE 9. PROPERTY, PLANT AND EQUIPMENT

	Useful Lives	December 31, 2020	December 31, 2019
		($ in millions)	
Land and improvements to land	10-20 Years[(1)]	$ 282.7	$ 277.5
Buildings and building equipment	10-30 Years	409.4	392.4
Machinery and equipment	3-20 Years	5,945.2	5,566.0
Leasehold improvements	3-11 Years	8.3	9.9
Construction in progress		245.2	346.1
Property, plant and equipment		6,890.8	6,591.9
Accumulated depreciation		(3,719.8)	(3,268.1)
Property, plant and equipment, net		$ 3,171.0	$ 3,323.8

(1) Useful life is exclusively related to improvements to land as land is not depreciated.

The weighted-average useful life of machinery and equipment at December 31, 2020 was 11 years. Depreciation expense was $445.4 million, $493.3 million and $497.8 million for 2020, 2019 and 2018, respectively. Interest capitalized was $6.4 million, $10.8 million and $6.0 million for 2020, 2019 and 2018, respectively.

The consolidated statements of cash flows for the years ended December 31, 2020, 2019 and 2018, included an increase of $31.0 million and decreases of $5.7 million and $25.5 million, respectively, to capital expenditures, with the corresponding change to accounts payable and accrued liabilities, related to purchases of property, plant and equipment included in accounts payable and accrued liabilities at December 31, 2020, 2019 and 2018.

NOTE 10. OTHER ASSETS

Included in other assets were the following:

	December 31, 2020	December 31, 2019
	($ in millions)	
Supply contracts	$ 1,122.9	$ 1,112.6
Other	68.4	56.5
Other assets	$ 1,191.3	$ 1,169.1

On January 1, 2019, we sold our 9.1% limited partnership interest in Bay Gas Storage Company, Ltd. (Bay Gas) for $20.0 million. The sale closed on February 7, 2019 which resulted in a gain of $11.2 million for the year ended December 31, 2019 which was recorded to other income in the consolidated statements of operations.

For the year ended December 31, 2018, we recorded a $21.5 million non-cash impairment charge related to an adjustment to the value of our 9.1% limited partnership interest in Bay Gas. Bay Gas owns, leases and operates underground gas storage and related pipeline facilities, which are used to provide storage in the McIntosh, AL area and delivery of natural gas. The general partner, Sempra Energy (Sempra), announced in the second quarter of 2018 its plan to sell several assets including its 90.9% interest in Bay Gas. In connection with this decision, Sempra recorded an impairment charge related to Bay Gas adjusting the related assets' carrying values to an estimated fair value. We recorded a reduction in our investment in the non-consolidated affiliate for the proportionate share of the non-cash impairment charge. Olin has no other non-consolidated affiliates.

The losses of non-consolidated affiliates were $19.7 million for the year ended December 31, 2018, which reflect the $21.5 million non-cash impairment charge.

In connection with the Acquisition, Olin and Dow entered into arrangements for the long-term supply of ethylene by Dow to Olin, pursuant to which, among other things, Olin made upfront payments in order to receive ethylene at producer economics and for certain reservation fees and for the option to obtain additional ethylene at producer economics.

On February 27, 2017, we exercised the remaining option to reserve additional ethylene at producer economics from Dow. In connection with the exercise of this option, we also secured a long-term customer arrangement. As a result, an additional payment was made to Dow of $461.0 million during the second quarter of 2020. The original liability was discounted and recorded at present value as of March 31, 2017. The discounted amount of $40.9 million was recorded as interest expense from the inception through March 31, 2020. For the years ended December 31, 2020, 2019, and 2018 interest expense of $4.0 million, $17.0 million and $16.0 million, respectively, was recorded for accretion on the 2020 payment discount.

During the year ended December 31, 2020, a payment of $75.8 million was made associated with the resolution of a dispute over the allocation to Olin of certain capital costs incurred at our Plaquemine, LA site after the Closing Date of the Acquisition.

The weighted-average useful life of long-term supply contracts at December 31, 2020 was 20 years. For the years ended December 31, 2020, 2019 and 2018, amortization expense of $56.0 million, $39.9 million and $38.3 million, respectively, was recognized within cost of goods sold related to our supply contracts and is reflected in depreciation and amortization on the consolidated statements of cash flows. We estimate that amortization expense will be approximately $70 million in 2021, 2022, 2023, 2024 and 2025 related to our long-term supply contracts. The long-term supply contracts are monitored for impairment each reporting period.

NOTE 11. GOODWILL AND INTANGIBLE ASSETS

Changes in the carrying value of goodwill were as follows:

	Chlor Alkali Products and Vinyls	Epoxy	Total
		($ in millions)	
Balance at January 1, 2019	$ 1,832.6	$ 287.0	$ 2,119.6
Foreign currency translation adjustment	0.1	—	0.1
Balance at December 31, 2019	1,832.7	287.0	2,119.7
Goodwill impairment	(557.6)	(142.2)	(699.8)
Foreign currency translation adjustment	0.2	0.1	0.3
Balance at December 31, 2020	$ 1,275.3	$ 144.9	$ 1,420.2

During the first quarter of 2020, our market capitalization declined significantly compared to the fourth quarter of 2019. Over the same period, the equity value of our peer group companies and the overall U.S. stock market also declined significantly amid market volatility. These declines were driven by the uncertainty surrounding the outbreak of the 2019 Novel Coronavirus (COVID-19) global pandemic and other macroeconomic events impacting the various industries in which Olin and our peers participate. Additionally, the various governmental, business and consumer responses to the pandemic were expected to have a negative impact on the near-term demand for several of the products produced by our Chlor Alkali Products and Vinyls and Epoxy businesses. The full extent and duration of the impact of COVID-19 on our operations and financial performance was unknown at the time. As a result of these events, we identified triggering events associated with a significant overall decrease in our stock price, a significant adverse change in the business climate and a significant reduction in near-term cash flow projections and performed a quantitative goodwill impairment test during the first quarter of 2020. We used a discounted cash flow approach to develop the estimated fair value of our reporting units. Based on the aforementioned analysis, the estimated fair value of our reporting units exceeded the carrying value of the reporting units and no impairment charges were recorded.

Throughout the second and third quarters of 2020, the spread of the COVID-19 pandemic and the associated response has caused significant disruptions in the U.S. and global economies, resulting in the disruption of the supply and demand fundamentals of our Chemicals businesses. The various governmental, business and consumer responses to the pandemic continued to negatively impact the demand for several of the products produced by our Chlor Alkali Products and Vinyls and Epoxy businesses resulting in lower volumes and pricing during 2020 compared to 2019. Due to these factors, the triggering events identified in the first quarter associated with a significant adverse change in the business climate and a significant adverse reduction in near-term cash flow projections have persisted during 2020. Throughout the second and third quarters of 2020, the equity value of our peer group companies and the overall U.S. stock market improved significantly while Olin's stock price remained low. During the three months ended September 30, 2020, we identified a triggering event associated with a sustained significant overall decrease in our stock price. As a result, we performed an updated quantitative goodwill impairment test during the third quarter of 2020. We used a discounted cash flow approach to develop the estimated fair value of our reporting units.

Fair value determinations require considerable judgment and are sensitive to changes in underlying assumptions, estimates and market factors. The discount rate, profitability assumptions and terminal growth rate of our reporting units and the supply and demand fundamentals of the chlor alkali industry were the material assumptions utilized in the discounted cash flow model used to estimate the fair value of each reporting unit. The discount rate reflects a weighted-average cost of capital, which is calculated, in part based on observable market data. Some of this data (such as the risk free or treasury rate and the pretax cost of debt) are based on the market data at a point in time. Other data (such as the equity risk premium) are based upon market data over time for a peer group of companies in the chemical manufacturing or distribution industries with a market capitalization premium added, as applicable. Also factoring into the discount rate was a market participant's perceived risk (such as the company specific risk premium) in the valuation implied by the sustained reduction in our stock price.

The discounted cash flow analysis requires estimates, assumptions and judgments about future events. Our analysis uses our internally generated long-range plan. Specifically, the assumptions in our long-range plan about terminal growth rates, forecasted capital expenditures and changes in future working capital requirements are used to determine the implied fair value of each reporting unit. The long-range plan reflects management judgment, supplemented by independent chemical industry analyses which provide multi-year industry operating and pricing forecasts.

As a further indicator that each reporting unit has been valued appropriately using a discounted cash flow model, the aggregate fair value of all reporting units is reconciled to the total market value of Olin. Due to the sustained decline in our stock price, the decrease in the value of our reporting units reflects a market participant's perceived risk in the valuation implied by the sustained reduction in our stock price. As a result of this assessment, the carrying values of our Chlor Alkali Products and Vinyls and Epoxy reporting units exceeded the fair values which resulted in pre-tax goodwill impairment charges of $557.6 million and $142.2 million, respectively, for the year ended December 31, 2020. The goodwill impairment charge was calculated as the amount that the carrying value of the reporting unit, including any goodwill, exceeded its fair value and therefore the carrying value of our reporting units equal their fair value upon completion of the goodwill impairment test.

We believe the assumptions used in our goodwill impairment analysis are appropriate and result in reasonable estimates of the implied fair value of each reporting unit. However, given the economic environment and the uncertainties regarding the impact on our business, there can be no assurance that our estimates and assumptions, made for purposes of our goodwill impairment testing, will prove to be an accurate prediction of the future. If our assumptions regarding future performance are not achieved, or if our stock price experiences further sustained declines, we may be required to record additional goodwill impairment charges in future periods. It is not possible at this time to determine if any such future impairment charge would result or, if it does, whether such charge would be material. No impairment charges were recorded for 2019 or 2018.

Intangible assets consisted of the following:

		December 31,					
		2020			2019		
	Useful Lives	*Gross Amount*	*Accumulated Amortization*	*Net*	*Gross Amount*	*Accumulated Amortization*	*Net*
		($ in millions)					
Customers, customer contracts and relationships	10-15 Years	$ 681.0	$ (312.5)	$ 368.5	$ 673.5	$ (260.9)	$ 412.6
Trade name	5 Years	—	—	—	7.0	(6.0)	1.0
Acquired technology	5-7 Years	95.0	(65.3)	29.7	85.1	(51.8)	33.3
Other	10 Years	1.8	(0.6)	1.2	1.8	(0.6)	1.2
Total intangible assets		$ 777.8	$ (378.4)	$ 399.4	$ 767.4	$ (319.3)	$ 448.1

Amortization expense relating to intangible assets was $62.9 million, $62.8 million and $62.8 million in 2020, 2019 and 2018, respectively. We estimate that amortization expense will be approximately $63 million in 2021, approximately $55 million in 2022, approximately $37 million in both 2023 and 2024 and approximately $36 million in 2025.

NOTE 12. DEBT

	December 31, 2020	December 31, 2019
Notes payable:	($ in millions)	
Variable-rate Delayed Draw Term Loan secured facility, due 2024 (4.125% at December 31, 2020)	$ 500.0	$ —
Variable-rate Recovery Zone secured bonds, due 2024-2035 (3.625% and 2.85% at December 31, 2020 and 2019, respectively)	103.0	103.0
Variable-rate Go Zone secured bonds, due 2024 (3.625% and 2.85% at December 31, 2020 and 2019, respectively)	50.0	50.0
Variable-rate Industrial development and environmental improvement unsecured obligations, due 2025 (0.21% and 1.70% at December 31, 2020 and 2019, respectively)	2.9	2.9
10.00% secured senior notes, due 2025	500.0	500.0
9.75% secured senior notes, due 2023	120.0	720.0
9.50% secured senior notes, due 2025	500.0	—
5.625% secured senior notes, due 2029	750.0	750.0
5.50% unsecured senior notes, due 2022	200.0	200.0
5.125% secured senior notes, due 2027	500.0	500.0
5.00% secured senior notes, due 2030	550.0	550.0
Receivables Financing Agreement (See Note 6)	125.0	—
Finance lease obligations	4.3	5.3
Total notes payable	3,905.2	3,381.2
Deferred debt issuance costs	(37.4)	(38.2)
Unamortized bond original issue discount	(2.2)	—
Interest rate swaps	(1.8)	(2.2)
Total debt	3,863.8	3,340.8
Amounts due within one year	26.3	2.1
Total long-term debt	$ 3,837.5	$ 3,338.7

On October 15, 2020, Olin redeemed $600.0 million of the outstanding 9.75% senior notes due 2023 (2023 Notes). The 2023 Notes were redeemed at 102.438% of the principal amount of the 2023 Notes, resulting in a redemption premium of $14.6 million, which was recorded to interest expense. The 2023 Notes were redeemed by drawing $500.0 million of the Delayed Draw Term Loan Facility along with utilizing $114.6 million of cash on hand.

On May 19, 2020, Olin issued $500.0 million aggregate principal amount of 9.50% senior notes due June 1, 2025 (2025 Notes). The 2025 Notes were issued at 99.5% of par value, the discount from which is included within long-term debt in the consolidated balance sheets. Interest on the 2025 Notes is payable semi-annually beginning on December 1, 2020. Proceeds from the 2025 Notes were used for general corporate purposes.

On May 8, 2020, we entered into a $1,300.0 million senior secured credit facility (Senior Secured Credit Facility) that amended our existing five-year, $2,000.0 million senior credit facility. The Senior Secured Credit Facility included a senior secured delayed-draw term loan facility with aggregate commitments of $500.0 million (Delayed Draw Term Loan Facility) and a senior secured revolving credit facility with aggregate commitments in an amount equal to $800.0 million (Senior Revolving Credit Facility). The maturity date for the Senior Secured Credit Facility is July 16, 2024. The amendment modified the financial covenants of the Senior Secured Credit Facility to be less restrictive and expanded the permitted use of proceeds of the Delayed Draw Term Loan Facility to include general corporate purposes.

The amendment also requires that the obligations under the Senior Secured Credit Facility be guaranteed by certain of our domestic subsidiaries, which are also guarantors of Olin's outstanding notes, with the exception of the $200.0 million senior notes due 2022. The obligations under the Senior Secured Credit Facility are also secured by liens on substantially all of Olin's and the subsidiary guarantors' personal property (Collateral), other than certain principal properties and capital stock of subsidiaries, and subject to certain other exceptions. The amendment provides that substantially all guarantees under the Senior

Secured Credit Facility and liens on the Collateral may be released when our net leverage ratio is below 3.50 to 1.00 for two consecutive fiscal quarters.

On October 15, 2020, Olin drew the entire $500.0 million of the Delayed Draw Term Loan Facility. The Delayed Draw Term Loan Facility includes principal amortization amounts payable beginning the quarter ending after the facility is fully drawn at a rate of 5.0% per annum for the first two years, increasing to 7.5% per annum for the following year and to 10.0% per annum for the last two years. The Senior Revolving Credit Facility includes a $100.0 million letter of credit subfacility. At December 31, 2020, we had $799.6 million available under our $800.0 million Senior Revolving Credit Facility because we had issued $0.4 million of letters of credit.

Under the Senior Secured Credit Facility, we may select various floating rate borrowing options. The actual interest rate paid on borrowings under the Senior Secured Credit Facility is based on a pricing grid which is dependent upon the net leverage ratio as calculated under the terms of the applicable facility for the prior fiscal quarter. The Senior Secured Credit Facility includes various customary restrictive covenants, including restrictions related to the ratio of secured debt to earnings before interest expense, taxes, depreciation and amortization (secured leverage ratio) and the ratio of earnings before interest expense, taxes, depreciation and amortization to interest expense (coverage ratio). The calculation of secured debt in our secured leverage ratio excludes borrowings under the Receivables Financing Agreement, up to a maximum of $250.0 million. As of December 31, 2020, the only secured borrowings included in the secured leverage ratio were $500.0 million for our Delayed Draw Term Loan Facility and $153.0 million for our Go Zone and Recovery Zone bonds. Compliance with these covenants is determined quarterly. We were in compliance with all covenants and restrictions under all our outstanding credit agreements as of December 31, 2020, and no event of default had occurred that would permit the lenders under our outstanding credit agreements to accelerate the debt if not cured. In the future, our ability to generate sufficient operating cash flows, among other factors, will determine the amounts available to be borrowed under these facilities. As a result of our restrictive covenant related to the secured leverage ratio, the maximum additional borrowings available to us could be limited in the future. The limitation, if an amendment or waiver from our lenders is not obtained, could restrict our ability to borrow the maximum amounts available under the Senior Revolving Credit Facility and the Receivables Financing Agreement. As of December 31, 2020, there were no covenants or other restrictions that limited our ability to borrow.

On July 16, 2019, Olin issued $750.0 million aggregate principal amount of 5.625% senior notes due August 1, 2029 (2029 Notes), which were registered under the Securities Act of 1933, as amended. Interest on the 2029 Notes began accruing from July 16, 2019 and is payable semi-annually beginning on February 1, 2020. Proceeds from the 2029 Notes were used to redeem the remaining balance of the $1,375.0 million term loan facility of $493.0 million and $150.0 million of the Receivables Financing Agreement.

On July 16, 2019, Olin entered into a five-year, $2,000.0 million senior credit facility (2019 Senior Credit Facility), which replaced the existing $1,975.0 million senior credit facility. The 2019 Senior Credit Facility included a senior unsecured delayed-draw term loan facility in an aggregate principal amount of up to $1,200.0 million. The 2019 Senior Credit Facility also included a senior unsecured revolving credit facility with aggregate commitments in an amount equal to $800.0 million (2019 Senior Revolving Credit Facility), which was increased from $600.0 million. The 2019 Senior Revolving Credit Facility included a $100.0 million letter of credit subfacility. In December 2019, Olin amended the 2019 Senior Credit Facility which amended the restrictive covenants of the agreement, including expanding the coverage and leverage ratios to be less restrictive over the next two and a half years.

On January 19, 2018, Olin issued $550.0 million aggregate principal amount of 5.00% senior notes due February 1, 2030 (2030 Notes), which were registered under the Securities Act of 1933, as amended. Interest on the 2030 Notes began accruing from January 19, 2018 and is paid semi-annually beginning on August 1, 2018. Proceeds from the 2030 Notes were used to redeem $550.0 million of debt under the $1,375.0 million term loan facility.

For the year ended December 31, 2020, we recognized interest expense of $5.8 million for the write-off of unamortized deferred debt issuance costs related to the reduction of commitments under the Senior Secured Credit Facility and partial redemption of the 2023 Notes. For the year ended December 31, 2019, we recognized interest expense of $2.8 million for the write-off of unamortized deferred debt issuance costs related to the replacement of the existing $1,975.0 million senior credit facility, including the redemption of the remaining balance of the $1,375.0 million term loan facility, and the redemption of the remaining balance of and reduction in the borrowing capacity under the Receivables Financing Agreement. For the year ended December 31, 2018, we recognized interest expense of $2.6 million for the write-off of unamortized deferred debt issuance costs related to redemption of $550.0 million of debt under the $1,375.0 million term loan facility.

In 2020, we paid debt issuance costs of $10.3 million for the issuance of the 2025 Notes and amendments to our Senior Secured Credit Facility and Receivables Financing Agreement. In 2019, we paid debt issuance costs of $16.6 million for the issuance of the 2029 Notes and 2019 Senior Credit Facility. In 2018, we paid debt issuance costs of $8.5 million relating to the 2030 Notes.

At December 31, 2020, we had total letters of credit of $80.4 million outstanding, of which $0.4 million were issued under our Senior Revolving Credit Facility. The letters of credit are used to support certain long-term debt, certain workers compensation insurance policies, certain plant closure and post-closure obligations, certain international payment obligations and certain international pension funding requirements.

Annual maturities of long-term debt, including finance lease obligations, are $26.3 million in 2021, $351.1 million in 2022, $158.4 million in 2023, $483.3 million in 2024, $1,003.1 million in 2025 and a total of $1,883.0 million thereafter.

In August 2019, we terminated the April 2016 and October 2016 interest rate swaps which resulted in a loss of $2.3 million that will be deferred as an offset to the carrying value of the related debt and will be recognized to interest expense through October 2025.

Our interest rate swaps increased interest expense by $0.4 million in 2020 and reduced interest expense by $1.7 million and $6.8 million in 2019 and 2018, respectively. The difference between interest paid and interest received is included as an adjustment to interest expense.

Subsequent Event

On January 15, 2021, Olin redeemed the remaining $120.0 million of the outstanding 2023 Notes. The 2023 Notes were redeemed at 102.438% of the principal amount of the 2023 Notes, resulting in a redemption premium of $2.9 million. The remaining 2023 Notes were redeemed by utilizing $122.9 million of cash on hand.

NOTE 13. PENSION PLANS

We sponsor domestic and foreign defined benefit pension plans for eligible employees and retirees. Most of our domestic employees participate in defined contribution plans. However, a portion of our bargaining hourly employees continue to participate in our domestic qualified defined benefit pension plans under a flat-benefit formula. Our funding policy for the qualified defined benefit pension plans is consistent with the requirements of federal laws and regulations. Our foreign subsidiaries maintain pension and other benefit plans, which are consistent with local statutory practices.

Our domestic qualified defined benefit pension plan provides that if, within three years following a change of control of Olin, any corporate action is taken or filing made in contemplation of, among other things, a plan termination or merger or other transfer of assets or liabilities of the plan, and such termination, merger or transfer thereafter takes place, plan benefits would automatically be increased for affected participants (and retired participants) to absorb any plan surplus (subject to applicable collective bargaining requirements).

During 2019, we made a discretionary cash contribution to our domestic qualified defined benefit pension plan of $12.5 million. Based on our plan assumptions and estimates, we will not be required to make any cash contributions to the domestic qualified defined benefit pension plan at least through 2021.

We have international qualified defined benefit pension plans to which we made cash contributions of $2.1 million, $2.4 million and $2.6 million in 2020, 2019 and 2018, respectively, and we anticipate less than $5 million of cash contributions to international qualified defined benefit pension plans in 2021.

Pension Obligations and Funded Status

Changes in the benefit obligation and plan assets were as follows:

	December 31, 2020			December 31, 2019		
	U.S.	Foreign	Total	U.S.	Foreign	Total
Change in Benefit Obligation			($ in millions)			
Benefit obligation at beginning of year	$ 2,620.2	$ 377.6	$ 2,997.8	$ 2,365.5	$ 302.3	$ 2,667.8
Service cost	0.9	10.0	10.9	1.0	10.3	11.3
Interest cost	70.7	4.4	75.1	88.7	6.0	94.7
Actuarial loss	203.5	31.6	235.1	299.5	64.6	364.1
Benefits paid	(136.4)	(4.8)	(141.2)	(134.5)	(4.8)	(139.3)
Plan participant's contributions	—	0.4	0.4	—	1.7	1.7
Plan amendments	—	(4.2)	(4.2)	—	(0.7)	(0.7)
Foreign currency translation adjustments	—	31.4	31.4	—	(1.8)	(1.8)
Benefit obligation at end of year	$ 2,758.9	$ 446.4	$ 3,205.3	$ 2,620.2	$ 377.6	$ 2,997.8

	December 31, 2020			December 31, 2019		
	U.S.	Foreign	Total	U.S.	Foreign	Total
Change in Plan Assets			($ in millions)			
Fair value of plans' assets at beginning of year	$ 2,122.6	$ 76.7	$ 2,199.3	$ 1,925.8	$ 67.2	$ 1,993.0
Actual return on plans' assets	397.3	6.4	403.7	318.8	7.6	326.4
Employer contributions	0.3	2.1	2.4	12.5	2.4	14.9
Benefits paid	(136.4)	(2.9)	(139.3)	(134.5)	(3.4)	(137.9)
Foreign currency translation adjustments	—	3.0	3.0	—	2.9	2.9
Fair value of plans' assets at end of year	$ 2,383.8	$ 85.3	$ 2,469.1	$ 2,122.6	$ 76.7	$ 2,199.3

	December 31, 2020			December 31, 2019		
	U.S.	Foreign	Total	U.S.	Foreign	Total
Funded Status			($ in millions)			
Qualified plans	$ (371.8)	$ (358.5)	$ (730.3)	$ (494.3)	$ (298.4)	$ (792.7)
Non-qualified plans	(3.3)	(2.6)	(5.9)	(3.3)	(2.5)	(5.8)
Total funded status	$ (375.1)	$ (361.1)	$ (736.2)	$ (497.6)	$ (300.9)	$ (798.5)

Under ASC 715, we recorded a $17.9 million after-tax benefit ($30.7 million pretax) to shareholders' equity as of December 31, 2020 for our pension plans. This benefit primarily reflected favorable performance on plan assets during 2020, partially offset by a 80-basis point decrease in the domestic pension plans' discount rate. In 2019, we recorded a $145.5 million after-tax charge ($177.7 million pretax) to shareholders' equity as of December 31, 2019 for our pension plans. This charge primarily reflected a 100-basis point decrease in the domestic pension plans' discount rate, partially offset by favorable performance on plan assets during 2019.

The $235.1 million actuarial loss for 2020 was primarily due to a 80-basis point decrease in the domestic pension plans' discount rate. The $364.1 million actuarial loss for 2019 was primarily due to a 100-basis point decrease in the domestic pension plans' discount rate.

Amounts recognized in the consolidated balance sheets consisted of:

	December 31, 2020			December 31, 2019		
	U.S.	Foreign	Total	U.S.	Foreign	Total
	($ in millions)					
Accrued benefit in current liabilities	$ (0.7)	$ (2.2)	$ (2.9)	$ (0.6)	$ (0.2)	$ (0.8)
Accrued benefit in noncurrent liabilities	(374.4)	(358.9)	(733.3)	(497.0)	(300.7)	(797.7)
Accumulated other comprehensive loss	798.4	130.1	928.5	891.6	111.6	1,003.2
Net balance sheet impact	$ 423.3	$ (231.0)	$ 192.3	$ 394.0	$ (189.3)	$ 204.7

At December 31, 2020 and 2019, the benefit obligation of non-qualified pension plans was $5.9 million and $5.8 million, respectively, and was included in the above pension benefit obligation. There were no plan assets for these non-qualified pension plans. Benefit payments for the non-qualified pension plans are expected to be as follows: 2021—$0.8 million; 2022—$0.4 million; 2023—$0.4 million; 2024—$0.4 million; and 2025—$0.3 million. Benefit payments for the qualified plans are projected to be as follows: 2021—$146.6 million; 2022—$147.0 million; 2023—$147.8 million; 2024—$148.7 million; and 2025—$149.0 million.

	December 31,	
	2020	2019
	($ in millions)	
Projected benefit obligation	$ 3,205.3	$ 2,997.8
Accumulated benefit obligation	3,180.2	2,972.4
Fair value of plans' assets	2,469.1	2,199.3

	Years Ended December 31,		
	2020	2019	2018
Components of Net Periodic Benefit (Income) Costs	($ in millions)		
Service cost	$ 10.9	$ 11.3	$ 11.1
Interest cost	75.1	94.7	86.3
Expected return on plans' assets	(141.7)	(141.8)	(146.5)
Amortization of prior service cost	(0.4)	—	0.1
Recognized actuarial loss	44.4	27.0	34.5
Net periodic benefit (income) costs	$ (11.7)	$ (8.8)	$ (14.5)
Included in Other Comprehensive Loss (Pretax)			
Liability adjustment	$ (30.7)	$ 177.7	$ 100.6
Amortization of prior service costs and actuarial losses	(44.0)	(27.0)	(34.6)

The service cost component of net periodic benefit (income) cost related to the employees of the operating segments are allocated to the operating segments based on their respective estimated census data.

Pension Plan Assumptions

Certain actuarial assumptions, such as discount rate and long-term rate of return on plan assets, have a significant effect on the amounts reported for net periodic benefit cost and accrued benefit obligation amounts. We use a measurement date of December 31 for our pension plans.

	U.S. Pension Benefits			*Foreign Pension Benefits*		
Weighted-Average Assumptions	***2020***	***2019***	***2018***	***2020***	***2019***	***2018***
Discount rate—periodic benefit cost	3.2 % (1)	4.2 %	3.6 %	1.4 %	2.2 %	2.2 %
Expected return on assets	7.75 %	7.75 %	7.75 %	4.4 %	5.2 %	5.2 %
Rate of compensation increase	3.0 %	3.0 %	3.0 %	2.7 %	2.9 %	2.9 %
Discount rate—benefit obligation	2.4 %	3.2 %	4.2 %	0.8 %	1.4 %	2.2 %

(1) The discount rate—periodic benefit cost for our domestic qualified pension plan is comprised of the discount rate used to determine interest costs of 2.8% and the discount rate used to determine service costs of 3.3%.

The discount rate is based on a hypothetical yield curve represented by a series of annualized individual zero-coupon bond spot rates for maturities ranging from one-half to thirty years. The bonds used in the yield curve must have a rating of AA or better per Standard & Poor's, be non-callable, and have at least $250 million par outstanding. The yield curve is then applied to the projected benefit payments from the plan. Based on these bonds and the projected benefit payment streams, the single rate that produces the same yield as the matching bond portfolio is used as the discount rate.

The long-term expected rate of return on plan assets represents an estimate of the long-term rate of returns on the investment portfolio consisting of equities, fixed income and alternative investments. We use long-term historical actual return information, the allocation mix of investments that comprise plan assets and forecast estimates of long-term investment returns, including inflation rates, by reference to external sources. The historic rates of return on plan assets have been 11.7% for the last 5 years, 9.6% for the last 10 years and 10.1% for the last 15 years. The following rates of return by asset class were considered in setting the long-term rate of return assumption:

U.S. equities	9%	to	13%
Non-U.S. equities	6%	to	11%
Fixed income/cash	5%	to	9%
Alternative investments	5%	to	15%

Plan Assets

Our pension plan asset allocations at December 31, 2020 and 2019 by asset class were as follows:

	Percentage of Plan Assets	
Asset Class	***2020***	***2019***
U.S. equities	13 %	11 %
Non-U.S. equities	17 %	17 %
Fixed income/cash	35 %	38 %
Alternative investments	35 %	34 %
Total	100 %	100 %

The Alternative Investments asset class includes hedge funds, real estate and private equity investments. The Alternative Investments class is intended to help diversify risk and increase returns by utilizing a broader group of assets.

A master trust was established by our pension plan to accumulate funds required to meet benefit payments of our plan and is administered solely in the interest of our plan's participants and their beneficiaries. The master trust's investment horizon is long term. Its assets are managed by professional investment managers or invested in professionally managed investment vehicles.

Our pension plan maintains a portfolio of assets designed to achieve an appropriate risk adjusted return. The portfolio of assets is also structured to manage risk by diversifying assets across asset classes whose return patterns are not highly correlated, investing in passively and actively managed strategies and in value and growth styles, and by periodic rebalancing of asset classes, strategies and investment styles to objectively set targets.

As of December 31, 2020, the following target allocation and ranges have been set for each asset class:

Asset Class	*Target Allocation*	*Target Range*
U.S. equities[(1)]	34 %	24-44
Non-U.S. equities[(1)]	22 %	0-42
Fixed income/cash[(1)]	37 %	25-90
Alternative investments	7 %	0-35

(1) The target allocation for these asset classes include alternative investments, primarily hedge funds, based on the underlying investments in each hedge fund.

Determining which hierarchical level an asset or liability falls within requires significant judgment. The following table summarizes our domestic and foreign defined benefit pension plan assets measured at fair value as of December 31, 2020:

Asset Class	*Investments Measured at Net Asset Value*	*Quoted Prices In Active Markets for Identical Assets (Level 1)*	*Significant Other Observable Inputs (Level 2)*	*Significant Unobservable Inputs (Level 3)*	*Total*
Equity securities			*($ in millions)*		
U.S. equities	$ 85.0	$ 233.6	$ —	$ —	$ 318.6
Non-U.S. equities	382.3	39.9	0.4	—	422.6
Fixed income/cash					
Cash	—	122.8	—	—	122.8
Government treasuries	—	—	419.9	—	419.9
Corporate debt instruments	114.6	—	62.1	—	176.7
Asset-backed securities	126.3	—	23.2	—	149.5
Alternative investments					
Hedge fund of funds	817.8	—	—	—	817.8
Real estate funds	9.0	—	—	—	9.0
Private equity funds	32.2	—	—	—	32.2
Total assets	$ 1,567.2	$ 396.3	$ 505.6	$ —	$ 2,469.1

The following table summarizes our domestic and foreign defined benefit pension plan assets measured at fair value as of December 31, 2019:

Asset Class	*Investments Measured at Net Asset Value*	*Quoted Prices In Active Markets for Identical Assets (Level 1)*	*Significant Other Observable Inputs (Level 2)*	*Significant Unobservable Inputs (Level 3)*	*Total*
			($ in millions)		
Equity securities					
U.S. equities	$ 117.2	$ 132.8	$ —	$ —	$ 250.0
Non-U.S. equities	341.2	32.7	0.3	—	374.2
Fixed income/cash					
Cash	—	101.5	—	—	101.5
Government treasuries	—	—	285.0	—	285.0
Corporate debt instruments	99.1	—	158.3	—	257.4
Asset-backed securities	166.9	—	19.2	—	186.1
Alternative investments					
Hedge fund of funds	698.3	—	—	—	698.3
Real estate funds	16.9	—	—	—	16.9
Private equity funds	29.9	—	—	—	29.9
Total assets	$ 1,469.5	$ 267.0	$ 462.8	$ —	$ 2,199.3

U.S. equities—This class included actively and passively managed equity investments in common stock and commingled funds comprised primarily of large-capitalization stocks with value, core and growth strategies.

Non-U.S. equities—This class included actively managed equity investments in commingled funds comprised primarily of international large-capitalization stocks from both developed and emerging markets.

Fixed income and cash—This class included commingled funds comprised of debt instruments issued by the U.S. and Canadian Treasuries, U.S. Agencies, corporate debt instruments, asset- and mortgage-backed securities and cash.

Hedge fund of funds—This class included a hedge fund which invests in the following types of hedge funds:

Event driven hedge funds—This class included hedge funds that invest in securities to capture excess returns that are driven by market or specific company events including activist investment philosophies and the arbitrage of equity and private and public debt securities.

Market neutral hedge funds—This class included investments in U.S. and international equities and fixed income securities while maintaining a market neutral position in those markets.

Other hedge funds—This class primarily included long-short equity strategies and a global macro fund which invested in fixed income, equity, currency, commodity and related derivative markets.

Real estate funds—This class included several funds that invest primarily in U.S. commercial real estate.

Private equity funds—This class included several private equity funds that invest primarily in infrastructure and U.S. power generation and transmission assets.

U.S. equities and non-U.S. equities are primarily valued at the net asset value provided by the independent administrator or custodian of the commingled fund. The net asset value is based on the value of the underlying equities, which are traded on an active market. U.S. equities are also valued at the closing price reported in an active market on which the individual securities are traded. A portion of our fixed income investments are valued at the net asset value provided by the independent administrator or custodian of the fund. The net asset value is based on the underlying assets, which are valued using inputs such as the closing price reported, if traded on an active market, values derived from comparable securities of issuers with similar credit ratings, or under a discounted cash flow approach that utilizes observable inputs, such as current yields of similar instruments, but includes adjustments for risks that may not be observable such as certain credit and liquidity risks. Alternative investments are valued at the net asset value as determined by the independent administrator or custodian of the fund. The net asset value is based on the underlying investments, which are valued using inputs such as quoted market prices of identical instruments, discounted future cash flows, independent appraisals and market-based comparable data. Absolute return strategies are commingled funds which reflect the fair value of our ownership interest in these funds. The investments in these commingled funds include some or all of the above asset classes and are primarily valued at net asset values based on the underlying investments, which are valued consistent with the methodologies described above for each asset class.

NOTE 14. POSTRETIREMENT BENEFITS

We provide certain postretirement healthcare (medical) and life insurance benefits for eligible active and retired domestic employees. The healthcare plans are contributory with participants' contributions adjusted annually based on medical rates of inflation and plan experience. We use a measurement date of December 31 for our postretirement plans.

Other Postretirement Benefits Obligations and Funded Status

Changes in the benefit obligation were as follows:

	December 31, 2020			December 31, 2019		
	U.S.	Foreign	Total	U.S.	Foreign	Total
Change in Benefit Obligation			($ in millions)			
Benefit obligation at beginning of year	$ 41.8	$ 10.9	$ 52.7	$ 37.5	$ 9.5	$ 47.0
Service cost	0.9	0.3	1.2	0.8	0.3	1.1
Interest cost	1.1	0.3	1.4	1.4	0.3	1.7
Actuarial loss	3.5	0.6	4.1	5.5	0.7	6.2
Benefits paid	(3.1)	(0.4)	(3.5)	(3.4)	(0.4)	(3.8)
Foreign currency translation adjustments	—	0.2	0.2	—	0.5	0.5
Benefit obligation at end of year	$ 44.2	$ 11.9	$ 56.1	$ 41.8	$ 10.9	$ 52.7

	December 31, 2020			December 31, 2019		
	U.S.	Foreign	Total	U.S.	Foreign	Total
			($ in millions)			
Funded status	$ (44.2)	$ (11.9)	$ (56.1)	$ (41.8)	$ (10.9)	$ (52.7)

Under ASC 715, we recorded a $3.1 million after-tax charge ($4.1 million pretax) to shareholders' equity as of December 31, 2020 for our other postretirement plans. In 2019, we recorded an after-tax charge of $4.7 million ($6.2 million pretax) to shareholders' equity as of December 31, 2019 for our other postretirement plans.

Amounts recognized in the consolidated balance sheets consisted of:

	December 31, 2020			December 31, 2019		
	U.S.	Foreign	Total	U.S.	Foreign	Total
			($ in millions)			
Accrued benefit in current liabilities	$ (3.1)	$ (0.3)	$ (3.4)	$ (3.3)	$ (0.4)	$ (3.7)
Accrued benefit in noncurrent liabilities	(41.1)	(11.6)	(52.7)	(38.5)	(10.5)	(49.0)
Accumulated other comprehensive loss	24.9	2.1	27.0	23.5	1.7	25.2
Net balance sheet impact	$ (19.3)	$ (9.8)	$ (29.1)	$ (18.3)	$ (9.2)	$ (27.5)

	Years Ended December 31,		
	2020	2019	2018
Components of Net Periodic Benefit Cost	($ in millions)		
Service cost	$ 1.2	$ 1.1	$ 1.3
Interest cost	1.4	1.7	1.5
Amortization of prior service cost	0.1	—	—
Recognized actuarial loss	2.2	2.1	2.4
Net periodic benefit cost	$ 4.9	$ 4.9	$ 5.2
Included in Other Comprehensive Loss (Pretax)			
Liability adjustment	$ 4.1	$ 6.2	$ (2.1)
Amortization of prior service costs and actuarial losses	(2.3)	(2.1)	(2.4)

The service cost component of net periodic postretirement benefit cost related to the employees of the operating segments are allocated to the operating segments based on their respective estimated census data.

Other Postretirement Benefits Plan Assumptions

Certain actuarial assumptions, such as discount rate, have a significant effect on the amounts reported for net periodic benefit cost and accrued benefit obligation amounts.

	December 31,		
Weighted-Average Assumptions	2020	2019	2018
Discount rate—periodic benefit cost	3.1 %	4.1 %	3.5 %
Discount rate—benefit obligation	2.3 %	3.1 %	4.1 %

The discount rate is based on a hypothetical yield curve represented by a series of annualized individual zero-coupon bond spot rates for maturities ranging from one-half to thirty years. The bonds used in the yield curve must have a rating of AA or better per Standard & Poor's, be non-callable, and have at least $250 million par outstanding. The yield curve is then applied to the projected benefit payments from the plan. Based on these bonds and the projected benefit payment streams, the single rate that produces the same yield as the matching bond portfolio is used as the discount rate.

We review external data and our own internal trends for healthcare costs to determine the healthcare cost for the post retirement benefit obligation. The assumed healthcare cost trend rates for pre-65 retirees were as follows:

	December 31,	
	2020	2019
Healthcare cost trend rate assumed for next year	7.3 %	7.5 %
Rate that the cost trend rate gradually declines to	4.5 %	4.5 %
Year that the rate reaches the ultimate rate	2031	2031

For post-65 retirees, we provide a fixed dollar benefit, which is not subject to escalation.

We expect to make payments of approximately $3 million for each of the next five years under the provisions of our other postretirement benefit plans.

NOTE 15. INCOME TAXES

	Years ended December 31,		
	2020	2019	2018
Components of Income (Loss) Before Taxes		($ in millions)	
Domestic	$ (1,025.2)	$ (1.3)	$ 288.0
Foreign	5.2	(35.6)	149.3
Income (loss) before taxes	$ (1,020.0)	$ (36.9)	$ 437.3
Components of Income Tax (Benefit) Provision			
Current (benefit) provision:			
Federal	$ (42.9)	$ 9.3	$ 21.7
State	0.5	3.2	5.1
Foreign	12.5	7.6	48.0
	(29.9)	20.1	74.8
Deferred (benefit) provision:			
Federal	(36.0)	(32.4)	27.0
State	(13.2)	(9.3)	(0.8)
Foreign	29.0	(4.0)	8.4
	(20.2)	(45.7)	34.6
Income tax (benefit) provision	$ (50.1)	$ (25.6)	$ 109.4

The following table accounts for the difference between the actual tax provision and the amounts obtained by applying the statutory U.S. federal income tax rate to the income (loss) before taxes.

	Years ended December 31,		
Effective Tax Rate Reconciliation (Percent)	2020	2019	2018
Statutory federal tax rate	21.0 %	21.0 %	21.0 %
State income taxes, net	1.1	(5.4)	2.0
Foreign rate differential	(0.2)	19.4	1.8
U.S. tax on foreign earnings	(1.8)	—	1.1
Salt depletion	1.0	29.0	(2.4)
Change in valuation allowance	(3.5)	(64.9)	3.8
Remeasurement of U.S. state deferred taxes	(0.1)	16.1	(0.6)
Change in tax contingencies	0.2	35.4	(0.7)
U.S. Tax Cuts and Jobs Act	—	—	(0.8)
Share-based payments	—	0.7	—
Dividends paid to Contributing Employee Ownership Plan	—	1.1	(0.1)
Return to provision	0.3	15.0	(0.1)
U.S. federal tax credits	0.2	6.4	(0.4)
Goodwill impairment charge	(13.3)	—	—
Other, net	—	(4.4)	0.4
Effective tax rate	4.9 %	69.4 %	25.0 %

The effective tax rate for 2020 included expenses associated with a net increase in the valuation allowance related to foreign and domestic tax credits and deferred tax assets in foreign jurisdictions, a remeasurement of deferred taxes due to an increase in our state effective tax rates and a change in tax contingencies, and stock-based compensation, partially offset by a benefit associated with prior year tax positions. These factors resulted in a net $27.9 million tax expense. For 2020, a tax benefit of $10.8 million was recognized associated with the $699.8 million goodwill impairment charge. After giving consideration to these items, including the goodwill impairment charge on Olin's loss before taxes, the effective tax rate for 2020 of 21.0% was equal to the 21% U.S. federal statutory rate as foreign income taxes, foreign income inclusions and a net increase in the valuation allowance related to losses in foreign jurisdictions were offset by state taxes and favorable permanent salt depletion deductions.

The effective tax rate for 2019 included benefits associated with the finalization of the Internal Revenue Service (IRS) review of years 2013 to 2015 U.S. income tax claims, stock-based compensation, prior year tax positions, foreign tax law changes, a remeasurement of deferred taxes due to a decrease in our state effective tax rates and a change in tax contingencies. The effective tax rate also included expenses associated with a net increase in the valuation allowance primarily related to foreign deferred tax assets and liabilities. These factors resulted in a net $19.4 million tax benefit. After giving consideration to these items, the effective tax rate for 2019 of 16.8% was lower than the 21% U.S. federal statutory rate primarily due to state taxes and a net increase in the valuation allowance related to losses in foreign jurisdictions, partially offset by foreign income taxes and favorable permanent salt depletion deductions.

The effective tax rate for 2018 included benefits associated with the U.S. Tax Cuts and Jobs Act (2017 Tax Act), stock-based compensation, changes in tax contingencies, a foreign dividend payment, changes associated with prior year tax positions and the remeasurement of deferred taxes due to a decrease in our state effective tax rates. The effective tax rate also included expenses associated with a net increase in the valuation allowance related to deferred tax assets in foreign jurisdictions and the remeasurement of deferred taxes due to changes in our foreign tax rates. These factors resulted in a net $2.9 million tax benefit, of which $3.8 million related to the increase of the 2017 Tax Act benefit. After giving consideration to these items, the effective tax rate for 2018 of 25.7% was higher than the 21% U.S. federal statutory rate primarily due to state and foreign income taxes, foreign income inclusions and a net increase in the valuation allowance related to current year losses in foreign jurisdictions, partially offset by favorable permanent salt depletion deductions.

	December 31,	
Components of Deferred Tax Assets and Liabilities	***2020***	***2019***
Deferred tax assets:	*($ in millions)*	
Pension and postretirement benefits	$ 181.9	$ 190.6
Environmental reserves	36.3	34.5
Asset retirement obligations	16.4	13.2
Accrued liabilities	54.1	38.6
Lease liabilities	87.4	90.0
Tax credits	49.8	25.1
Net operating losses	141.0	70.0
Capital loss carryforward	0.9	0.9
Interest deduction limitation	7.0	41.8
Other miscellaneous items	—	20.2
Total deferred tax assets	574.8	524.9
Valuation allowance	(239.6)	(182.1)
Net deferred tax assets	335.2	342.8
Deferred tax liabilities:		
Property, plant and equipment	530.4	525.0
Right-of-use lease assets	86.2	88.8
Intangible amortization	40.0	54.6
Inventory and prepaids	17.4	20.6
Partnerships	80.9	67.3
Taxes on unremitted earnings	6.1	5.7
Other miscellaneous items	6.2	—
Total deferred tax liabilities	767.2	762.0
Net deferred tax liability	$ (432.0)	$ (419.2)

Realization of the net deferred tax assets, irrespective of indefinite-lived deferred tax liabilities, is dependent on future reversals of existing taxable temporary differences and adequate future taxable income, exclusive of reversing temporary differences and carryforwards. Although realization is not assured, we believe that it is more likely than not that the net deferred tax assets will be realized.

At December 31, 2020, we had a U.S. federal net operating loss (NOL) of $253.1 million (representing $53.2 million of deferred tax assets), which do not expire.

At December 31, 2020, we had deferred state tax assets of $25.9 million relating to state NOLs, which will expire in years 2021 through 2040, if not utilized.

At December 31, 2020, we had deferred state tax assets of $23.3 million relating to state tax credits, which will expire in years 2021 through 2035, if not utilized.

At December 31, 2020, we had a capital loss carryforward of $3.6 million (representing $0.9 million of deferred tax assets) which is available to offset future consolidated capital gains that will expire in years 2021 through 2025, if not utilized.

At December 31, 2020, we had U.S. federal tax credits of $10.5 million, that will expire in years 2038 through 2040, if not utilized.

At December 31, 2020, we had foreign tax credits of $16.9 million, that will expire in years 2027 through 2030, if not utilized.

At December 31, 2020, we had NOLs of approximately $362.8 million (representing $61.9 million of deferred tax assets) in various foreign jurisdictions. Of these, $59.9 million (representing $14.5 million of deferred tax assets) expire in various years from 2022 to 2040. The remaining $302.9 million (representing $47.4 million of deferred tax assets) do not expire.

As of December 31, 2020, we had recorded a valuation allowance of $239.6 million, compared to $182.1 million as of December 31, 2019. The increase of $57.5 million is primarily due to the recent history of cumulative losses within foreign jurisdictions and projections of future taxable income insufficient to overcome the loss history. We continue to have net deferred tax assets in several jurisdictions which we expect to realize, assuming sufficient taxable income can be generated to utilize these deferred tax benefits, which is based on certain estimates and assumptions. If these estimates and related assumptions change in the future, we may be required to reduce the value of the deferred tax assets resulting in additional tax expense.

The activity of our deferred income tax valuation allowance was as follows:

	December 31,	
	2020	***2019***
	($ in millions)	
Beginning balance	$ 182.1	$ 147.4
Increases to valuation allowances	54.6	38.1
Decreases to valuation allowances	(2.2)	(0.7)
Foreign currency translation adjustments	5.1	(2.7)
Ending balance	$ 239.6	$ 182.1

As of December 31, 2020, we had $21.3 million of gross unrecognized tax benefits, which would have a net $21.2 million impact on the effective tax rate, if recognized. As of December 31, 2019, we had $22.8 million of gross unrecognized tax benefits, which would have a net $22.4 million impact on the effective tax rate, if recognized. The change for both 2020 and 2019 primarily relates to additional gross unrecognized benefits for current and prior year tax positions, as well as decreases for prior year tax positions. The amounts of unrecognized tax benefits were as follows:

	December 31,	
	2020	***2019***
	($ in millions)	
Beginning balance	$ 22.8	$ 33.8
Increase for current year tax positions	1.7	2.0
Increase for prior year tax positions	0.2	1.5
Decrease for prior year tax positions	(3.5)	(14.3)
Decrease due to tax settlements	—	(0.2)
Foreign currency translation adjustments	0.1	—
Ending balance	$ 21.3	$ 22.8

In July 2019, the review of certain U.S. income tax claims by the IRS for the years 2013 to 2015 was finalized which resulted in a $14.3 million income tax benefit primarily related to favorable adjustments in uncertain tax positions for prior tax years.

We recognize interest and penalty expense related to unrecognized tax positions as a component of the income tax provision. As of both December 31, 2020 and 2019, interest and penalties accrued were $0.1 million. For 2020, 2019 and 2018, we recorded (benefit) expense related to interest and penalties of $(0.1) million, $(1.5) million and $0.4 million, respectively.

As of December 31, 2020, we believe it is reasonably possible that our total amount of unrecognized tax benefits will decrease by approximately $6.9 million over the next twelve months. The anticipated reduction primarily relates to settlements with tax authorities and the expiration of federal, state and foreign statutes of limitation.

We operate globally and file income tax returns in numerous jurisdictions. Our tax returns are subject to examination by various federal, state and local tax authorities. Our 2016 U.S. federal income tax return is currently under examination by the IRS. Additionally, examinations are ongoing in various states and foreign jurisdictions. We believe we have adequately provided for all tax positions; however, amounts asserted by taxing authorities could be greater than our accrued position. For our primary tax jurisdictions, the tax years that remain subject to examination are as follows:

	Tax Years
U.S. federal income tax	2016 - 2019
U.S. state income tax	2012 - 2019
Canadian federal income tax	2013 - 2019
Brazil	2015 - 2019
Germany	2015 - 2019
China	2014 - 2019
The Netherlands	2015 - 2019

NOTE 16. ACCRUED LIABILITIES

Included in accrued liabilities were the following:

	December 31,	
	2020	2019
	($ in millions)	
Accrued compensation and payroll taxes	$ 57.2	$ 56.3
Tax-related accruals	54.5	37.4
Accrued interest	59.2	68.2
Legal and professional costs	40.2	52.4
Accrued employee benefits	29.6	24.0
Manufacturing related accruals	22.4	1.3
Environmental (current portion only)	19.0	17.0
Asset retirement obligation (current portion only)	18.0	10.3
Restructuring reserves (current portion only)	2.6	2.1
Derivative contracts	0.1	19.0
Other	55.2	41.1
Accrued liabilities	$ 358.0	$ 329.1

NOTE 17. CONTRIBUTING EMPLOYEE OWNERSHIP PLAN

The Contributing Employee Ownership Plan (CEOP) is a defined contribution plan available to essentially all domestic employees. We provide a contribution to an individual retirement contribution account maintained with the CEOP equal to an amount of between 5.0% and 7.5% of the employee's eligible compensation. The defined contribution plan expense was $30.6 million, $29.9 million and $28.6 million for 2020, 2019 and 2018, respectively.

Company matching contributions are invested in the same investment allocation as the employee's contribution. Our matching contributions for eligible employees amounted to $3.7 million, $15.8 million and $14.9 million in 2020, 2019 and 2018, respectively. Effective January 1, 2020, we suspended the match on all salaried and non-bargaining hourly employees' contributions, and moved to a discretionary contribution model with contributions contingent upon company-wide financial performance. For the year ended December 31, 2020, we did not make a discretionary matching contribution. Effective January 1, 2021, we reinstated the match on all salaried and non-bargaining hourly employees' contributions, which provides for a maximum 3% matching contribution based on the level of participant contributions.

Employees generally become vested in the value of the contributions we make to the CEOP according to a schedule based on service. After 2 years of service, participants are 25% vested. They vest in increments of 25% for each additional year and after 5 years of service, they are 100% vested in the value of the contributions that we have made to their accounts.

Employees may transfer any or all of the value of the investments, including Olin common stock, to any one or combination of investments available in the CEOP. Employees may transfer balances daily and may elect to transfer any percentage of the balance in the fund from which the transfer is made. However, when transferring out of a fund, employees are prohibited from trading out of the fund to which the transfer was made for seven calendar days. This limitation does not apply to trades into the money market fund or the Olin Common Stock Fund.

NOTE 18. STOCK-BASED COMPENSATION

Stock-based compensation expense was allocated to the operating segments for the portion related to employees whose compensation would be included in cost of goods sold with the remainder recognized in corporate/other. There were no significant capitalized stock-based compensation costs. Stock-based compensation granted includes stock options, performance stock awards, restricted stock awards and deferred directors' compensation. Stock-based compensation expense was as follows:

	Years ended December 31,		
	2020	2019	2018
	($ in millions)		
Stock-based compensation	$ 17.5	$ 9.4	$ 19.3
Mark-to-market adjustments	4.8	(1.8)	(10.7)
Total expense	$ 22.3	$ 7.6	$ 8.6

Stock Plans

Under the stock option and long-term incentive plans, options may be granted to purchase shares of our common stock at an exercise price not less than fair market value at the date of grant, and are exercisable for a period not exceeding ten years from that date. Stock options, restricted stock and performance shares typically vest over three years. We issue shares to settle stock options, restricted stock and share-based performance awards. In 2020, 2019 and 2018, long-term incentive awards included stock options, performance share awards and restricted stock. The stock option exercise price was set at the fair market value of common stock on the date of the grant, and the options have a ten-year term.

Stock option transactions were as follows:

				Exercisable	
	Shares	Option Price	Weighted-Average Option Price	Options	Weighted-Average Exercise Price
Outstanding at January 1, 2020	7,210,551	$13.14-32.94	$ 24.95	4,648,574	$ 23.07
Granted	2,663,100	17.33-17.33	17.33		
Exercised	(190,295)	13.14-18.78	17.42		
Canceled	(555,981)	13.14-32.94	22.03		
Outstanding at December 31, 2020	9,127,375	$13.14-32.94	$ 23.06	5,671,371	$ 24.57

At December 31, 2020, the average exercise period for all outstanding and exercisable options was 77 months and 60 months, respectively. At December 31, 2020, the aggregate intrinsic value (the difference between the exercise price and market value) for outstanding options was $33.8 million and exercisable options was $16.0 million. The total intrinsic value of options exercised during the years ended December 31, 2020, 2019 and 2018 was $0.6 million, $1.3 million and $2.9 million, respectively.

The total unrecognized compensation cost related to unvested stock options at December 31, 2020 was $9.9 million and was expected to be recognized over a weighted-average period of 1.3 years.

The following table provides certain information with respect to stock options exercisable at December 31, 2020:

Range of Exercise Prices	*Options Exercisable*	*Weighted-Average Exercise Price*	*Options Outstanding*	*Weighted-Average Exercise Price*
Under $22.00	1,570,673	$ 15.14	3,936,073	$ 16.45
$22.00 - $28.00	2,096,617	25.77	2,953,235	25.91
Over $28.00	2,004,081	30.70	2,238,067	30.93
	5,671,371		9,127,375	

At December 31, 2020, common shares reserved for issuance and available for grant or purchase under the following plans consisted of:

	Number of Shares	
Stock Option Plans	*Reserved for Issuance*	*Available for Grant or Purchase*[(1)]
2000 long term incentive plan	18,666	—
2003 long term incentive plan	178,284	—
2006 long term incentive plan	93,190	—
2009 long term incentive plan	1,510,954	—
2014 long term incentive plan	1,784,213	—
2016 long term incentive plan	1,967,666	—
2018 long term incentive plan	9,933,512	4,834,380
Total under stock option plans	15,486,485	4,834,380

	Number of Shares	
Stock Purchase Plans	*Reserved for Issuance*	*Available for Grant or Purchase*
1997 stock plan for non-employee directors	453,323	176,088

(1) All available to be issued as stock options, but includes a sub-limit for all types of stock awards of 472,630 shares.

Under the stock purchase plans, our non-employee directors may defer certain elements of their compensation into shares of our common stock based on fair market value of the shares at the time of deferral. Non-employee directors annually receive stock grants as a portion of their director compensation. Of the shares reserved under the stock purchase plans at December 31, 2020, 277,716 shares were committed.

Performance share awards are denominated in shares of our stock and are paid half in cash and half in stock. Payouts for performance share awards are based on two criteria: (1) 50% of the award is based on Olin's total shareholder returns over the applicable three-year performance cycle in relation to the total shareholder return over the same period among a portfolio of public companies which are selected in concert with outside compensation consultants and (2) 50% of the award is based on Olin's net income over the applicable three-year performance cycle in relation to the net income goal for such period as set by the compensation committee of Olin's board of directors. The expense associated with performance shares is recorded based on our estimate of our performance relative to the respective target. If an employee leaves the company before the end of the performance cycle, the performance shares may be prorated based on the number of months of the performance cycle worked and are settled in cash instead of half in cash and half in stock when the three-year performance cycle is completed. Performance share transactions were as follows:

	To Settle in Cash		*To Settle in Shares*	
	Shares	***Weighted-Average Fair Value per Share***	***Shares***	***Weighted-Average Fair Value per Share***
Outstanding at January 1, 2020	317,710	$ 17.18	304,075	$ 28.91
Granted	238,050	17.33	238,050	17.33
Paid/Issued	(69,639)	17.18	(64,970)	29.75
Converted from shares to cash	22,952	25.10	(22,952)	25.10
Canceled	(115,868)	21.29	(108,773)	27.83
Outstanding at December 31, 2020	393,205	$ 24.84	345,430	$ 21.37
Total vested at December 31, 2020	216,955	$ 24.84	168,230	$ 23.41

The summary of the status of our unvested performance shares to be settled in cash were as follows:

	Shares	***Weighted-Average Fair Value per Share***
Unvested at January 1, 2020	125,567	$ 17.18
Granted	238,050	17.33
Vested	(120,982)	24.84
Canceled	(66,385)	19.61
Unvested at December 31, 2020	176,250	$ 24.84

At December 31, 2020, the liability recorded for performance shares to be settled in cash totaled $5.4 million. The total unrecognized compensation cost related to unvested performance shares at December 31, 2020 was $7.8 million and was expected to be recognized over a weighted-average period of 1.2 years.

NOTE 19. SHAREHOLDERS' EQUITY

On April 26, 2018, our board of directors authorized a share repurchase program for the purchase of shares of common stock at an aggregate price of up to $500.0 million. This program will terminate upon the purchase of $500.0 million of our common stock.

There were no shares repurchased for the year ended December 31, 2020. On August 5, 2019, we entered into an accelerated share repurchase (ASR) agreement with Goldman Sachs & Co. LLC, a third-party financial institution, to repurchase $100.0 million of Olin's common stock. This authorization was granted under the April 26, 2018 share repurchase program and reduced the remaining authorized repurchase amount under that program by $100.0 million. In connection with this agreement, we repurchased a total of 5.7 million shares under this ASR agreement.

For the year ended December 31, 2019, 8.0 million shares were repurchased and retired at a cost of $145.9 million. As of December 31, 2020, a cumulative total of 10.1 million shares were repurchased and retired at a cost of $195.9 million and $304.1 million of common stock remained authorized to be repurchased.

During 2020, 2019 and 2018, we issued 0.1 million, 0.1 million and 0.2 million shares, respectively, with a total value of $1.9 million, $1.7 million and $3.4 million, respectively, representing stock options exercised.

We have registered an undetermined amount of securities with the SEC, so that, from time-to-time, we may issue debt securities, preferred stock and/or common stock and associated warrants in the public market under that registration statement.

In February 2018, the FASB issued ASU 2018-02, "Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income" which amends ASC 220 "Income Statement—Reporting Comprehensive Income." This update allows a reclassification from accumulated other comprehensive loss to retained earnings for the stranded tax effects resulting from the 2017 Tax Act during each fiscal year or quarter in which the effect of the lower tax rate is recorded. We adopted this update in March 2018 and reclassified $85.9 million related to the deferred gain resulting from the 2017 Tax Act from accumulated other comprehensive loss to retained earnings.

The following table represents the activity included in accumulated other comprehensive loss:

	Foreign Currency Translation Adjustment (net of taxes)	*Unrealized Gains (Losses) on Derivative Contracts (net of taxes)*	*Pension and Other Postretirement Benefits (net of taxes)*	*Accumulated Other Comprehensive Loss*
		($ in millions)		
Balance at January 1, 2018	$ 7.6	$ 11.1	$ (503.3)	$ (484.6)
Unrealized losses	(22.2)	(1.1)	(98.5)	(121.8)
Reclassification adjustments of (gains) losses into income	—	(14.3)	37.0	22.7
Tax benefit	—	3.7	14.9	18.6
Net change	(22.2)	(11.7)	(46.6)	(80.5)
Income tax reclassification adjustment	15.3	2.4	(103.6)	(85.9)
Balance at December 31, 2018	0.7	1.8	(653.5)	(651.0)
Unrealized losses	(9.1)	(47.1)	(183.9)	(240.1)
Reclassification adjustments of losses into income	—	26.9	29.1	56.0
Tax benefit	—	4.8	26.9	31.7
Net change	(9.1)	(15.4)	(127.9)	(152.4)
Balance at December 31, 2019	(8.4)	(13.6)	(781.4)	(803.4)
Unrealized gains	27.8	31.1	26.6	85.5
Reclassification adjustments of losses into income	—	14.9	46.3	61.2
Tax provision	—	(11.0)	(22.2)	(33.2)
Net change	27.8	35.0	50.7	113.5
Balance at December 31, 2020	$ 19.4	$ 21.4	$ (730.7)	$ (689.9)

Net income (loss), interest expense and cost of goods sold included reclassification adjustments for realized gains and losses on derivative contracts from accumulated other comprehensive loss.

Net income (loss) and non-operating pension income included the amortization of prior service costs and actuarial losses from accumulated other comprehensive loss.

NOTE 20. SEGMENT INFORMATION

We define segment results as income (loss) before interest expense, interest income, goodwill impairment charges, other operating income (expense), non-operating pension income, other income and income taxes, and includes the operating results of non-consolidated affiliates. Consistent with the guidance in ASC 280 "Segment Reporting," we have determined it is appropriate to include the operating results of non-consolidated affiliates in the relevant segment financial results. We have three operating segments: Chlor Alkali Products and Vinyls, Epoxy and Winchester. The three operating segments reflect the organization used by our management for purposes of allocating resources and assessing performance. Chlorine used in our Epoxy segment is transferred at cost from the Chlor Alkali Products and Vinyls segment. Sales and profits are recognized in the Chlor Alkali Products and Vinyls segment for all caustic soda generated and sold by Olin.

	Years ended December 31,		
	2020	***2019***	***2018***
Sales:	*($ in millions)*		
Chlor Alkali Products and Vinyls	$ 2,959.9	$ 3,420.1	$ 3,986.7
Epoxy	1,870.5	2,024.4	2,303.1
Winchester	927.6	665.5	656.3
Total sales	$ 5,758.0	$ 6,110.0	$ 6,946.1
Income (loss) before taxes:			
Chlor Alkali Products and Vinyls	$ 3.5	$ 336.7	$ 637.1
Epoxy	40.8	53.9	52.8
Winchester	92.3	40.1	38.4
Corporate/Other:			
Environmental (expense) income	(20.9)	(20.5)	103.7
Other corporate and unallocated costs	(154.3)	(156.3)	(158.3)
Restructuring charges	(9.0)	(76.5)	(21.9)
Acquisition-related costs	—	—	(1.0)
Goodwill impairment	(699.8)	—	—
Other operating income	0.7	0.4	6.4
Interest expense	(292.7)	(243.2)	(243.2)
Interest income	0.5	1.0	1.6
Non-operating pension income	18.9	16.3	21.7
Other income	—	11.2	—
Income (loss) before taxes	$ (1,020.0)	$ (36.9)	$ 437.3
Losses of non-consolidated affiliates:			
Chlor Alkali Products and Vinyls	$ —	$ —	$ (19.7)
Depreciation and amortization expense:			
Chlor Alkali Products and Vinyls	$ 451.4	$ 470.4	$ 473.1
Epoxy	90.7	100.1	102.4
Winchester	20.1	20.1	20.0
Corporate/Other	6.2	6.8	5.9
Total depreciation and amortization expense	$ 568.4	$ 597.4	$ 601.4
Capital spending:			
Chlor Alkali Products and Vinyls	$ 180.4	$ 240.3	$ 259.9
Epoxy	33.7	30.0	36.3
Winchester	24.5	12.1	14.7
Corporate/Other	60.3	103.2	74.3
Total capital spending	$ 298.9	$ 385.6	$ 385.2

Segment assets include only those assets which are directly identifiable to an operating segment. Assets of the corporate/other segment include primarily such items as cash and cash equivalents, deferred taxes and other assets.

	December 31,	
	2020	2019
Assets:	($ in millions)	
Chlor Alkali Products and Vinyls	$ 6,165.5	$ 6,898.7
Epoxy	1,153.2	1,469.1
Winchester	468.2	385.0
Corporate/Other	484.0	435.0
Total assets	$ 8,270.9	$ 9,187.8

Property, plant and equipment is attributed to geographic areas based on asset location and sales are attributed to geographic areas based on customer location.

	December 31,	
	2020	2019
Property, plant and equipment:	($ in millions)	
United States	$ 2,860.1	$ 3,017.4
Foreign	310.9	306.4
Total property, plant and equipment	$ 3,171.0	$ 3,323.8

	Years ended December 31,		
	2020	2019	2018
Sales by geography:	($ in millions)		
Chlor Alkali Products and Vinyls			
United States	$ 2,208.5	$ 2,332.1	$ 2,610.7
Europe	104.4	134.5	181.8
Other foreign	647.0	953.5	1,194.2
Total Chlor Alkali Products and Vinyls	2,959.9	3,420.1	3,986.7
Epoxy			
United States	622.8	664.0	742.7
Europe	684.4	844.2	991.1
Other foreign	563.3	516.2	569.3
Total Epoxy	1,870.5	2,024.4	2,303.1
Winchester			
United States	865.9	603.4	591.0
Europe	9.3	11.7	11.0
Other foreign	52.4	50.4	54.3
Total Winchester	927.6	665.5	656.3
Total			
United States	3,697.2	3,599.5	3,944.4
Europe	798.1	990.4	1,183.9
Other foreign	1,262.7	1,520.1	1,817.8
Total sales	$ 5,758.0	$ 6,110.0	$ 6,946.1

Sales by product line:	2020	2019	2018
	Years ended December 31, ($ in millions)		
Chlor Alkali Products and Vinyls			
Caustic soda	$ 1,408.3	$ 1,737.4	$ 2,198.6
Chlorine, chlorine derivatives and other co-products	1,551.6	1,682.7	1,788.1
Total Chlor Alkali Products and Vinyls	2,959.9	3,420.1	3,986.7
Epoxy			
Aromatics and allylics	821.0	945.3	1,145.7
Epoxy resins	1,049.5	1,079.1	1,157.4
Total Epoxy	1,870.5	2,024.4	2,303.1
Winchester			
Commercial	640.5	441.3	427.6
Military and law enforcement	287.1	224.2	228.7
Total Winchester	927.6	665.5	656.3
Total sales	$ 5,758.0	$ 6,110.0	$ 6,946.1

NOTE 21. ENVIRONMENTAL

As is common in our industry, we are subject to environmental laws and regulations related to the use, storage, handling, generation, transportation, emission, discharge, disposal and remediation of, and exposure to, hazardous and non-hazardous substances and wastes in all of the countries in which we do business.

The establishment and implementation of national, state or provincial and local standards to regulate air, water and land quality affect substantially all of our manufacturing locations around the world. Laws providing for regulation of the manufacture, transportation, use and disposal of hazardous and toxic substances, and remediation of contaminated sites, have imposed additional regulatory requirements on industry, particularly the chemicals industry. In addition, implementation of environmental laws has required and will continue to require new capital expenditures and will increase plant operating costs. We employ waste minimization and pollution prevention programs at our manufacturing sites.

We are party to various government and private environmental actions associated with past manufacturing facilities and former waste disposal sites. Associated costs of investigatory and remedial activities are provided for in accordance with generally accepted accounting principles governing probability and the ability to reasonably estimate future costs. Our ability to estimate future costs depends on whether our investigatory and remedial activities are in preliminary or advanced stages. With respect to unasserted claims, we accrue liabilities for costs that, in our experience, we expect to incur to protect our interests against those unasserted claims. Our accrued liabilities for unasserted claims amounted to $9.0 million at December 31, 2020. With respect to asserted claims, we accrue liabilities based on remedial investigation, feasibility study, remedial action and operation, maintenance and monitoring (OM&M) expenses that, in our experience, we expect to incur in connection with the asserted claims. Required site OM&M expenses are estimated and accrued in their entirety for required periods not exceeding 30 years, which reasonably approximates the typical duration of long-term site OM&M.

Our liabilities for future environmental expenditures were as follows:

	December 31, 2020	December 31, 2019
	($ in millions)	
Beginning balance	$ 139.0	$ 125.6
Charges to income	20.9	25.3
Remedial and investigatory spending	(12.8)	(12.2)
Foreign currency translation adjustments	0.1	0.3
Ending balance	$ 147.2	$ 139.0

At December 31, 2020 and 2019, our consolidated balance sheets included environmental liabilities of $128.2 million and $122.0 million, respectively, which were classified as other noncurrent liabilities. Our environmental liability amounts do not take into account any discounting of future expenditures or any consideration of insurance recoveries or advances in technology. These liabilities are reassessed periodically to determine if environmental circumstances have changed and/or remediation efforts and our estimate of related costs have changed. As a result of these reassessments, future charges to income may be made for additional liabilities. Of the $147.2 million included on our consolidated balance sheet at December 31, 2020 for future environmental expenditures, we currently expect to utilize $88.5 million of the reserve for future environmental expenditures over the next 5 years, $27.6 million for expenditures 6 to 10 years in the future, and $31.1 million for expenditures beyond 10 years in the future.

Our total estimated environmental liability at December 31, 2020 was attributable to 58 sites, 14 of which were United States Environmental Protection Agency National Priority List sites. Nine sites accounted for 82% of our environmental liability and, of the remaining 49 sites, no one site accounted for more than 3% of our environmental liability. At seven of the nine sites, part of the site is in the long-term OM&M stage. At six of the nine sites, a remedial action plan is being developed for part of the site. At five of the nine sites, a remedial design is being developed at part of the site and at four of the nine sites, part of the site is subject to a remedial investigation. All nine sites are either associated with past manufacturing operations or former waste disposal sites. None of the nine largest sites represents more than 23% of the liabilities reserved on our consolidated balance sheet at December 31, 2020 for future environmental expenditures.

Environmental provisions charged (credited) to income, which are included in cost of goods sold, were as follows:

	Years ended December 31,		
	2020	2019	2018
		($ in millions)	
Provisions charged to income	$ 20.9	$ 25.3	$ 7.3
Insurance recoveries for costs incurred and expensed	—	(4.8)	(111.0)
Environmental expense (income)	$ 20.9	$ 20.5	$ (103.7)

During 2018, we settled certain disputes with respect to insurance coverage for costs at various environmental remediation sites for $121.0 million. Environmental expense (income) for the year ended December 31, 2018 include insurance recoveries for environmental costs incurred and expensed in prior periods of $111.0 million. The recoveries are reduced by estimated liabilities of $10.0 million associated with claims by subsequent owners of certain of the settled environmental sites. Environmental expense (income) for the year ended December 31, 2019 included $4.8 million of recoveries associated with resolving the outstanding third party claims against the proceeds from the 2018 environmental insurance settlement.

These charges relate primarily to remedial and investigatory activities associated with past manufacturing operations and former waste disposal sites and may be material to operating results in future years.

Annual environmental-related cash outlays for site investigation and remediation are expected to range between approximately $15 million to $25 million over the next several years, which are expected to be charged against reserves recorded on our consolidated balance sheet. While we do not anticipate a material increase in the projected annual level of our environmental-related cash outlays for site investigation and remediation, there is always the possibility that such an increase may occur in the future in view of the uncertainties associated with environmental exposures. Environmental exposures are difficult to assess for numerous reasons, including the identification of new sites, developments at sites resulting from investigatory studies, advances in technology, changes in environmental laws and regulations and their application, changes in regulatory authorities, the scarcity of reliable data pertaining to identified sites, the difficulty in assessing the involvement and financial capability of other Potentially Responsible Parties (PRPs), our ability to obtain contributions from other parties and the lengthy time periods over which site remediation occurs. It is possible that some of these matters (the outcomes of which are subject to various uncertainties) may be resolved unfavorably to us, which could materially adversely affect our financial position or results of operations. At December 31, 2020, we estimate that it is reasonably possible that we may have additional contingent environmental liabilities of $60 million in addition to the amounts for which we have already recorded as a reserve.

NOTE 22. LEASES

Our lease commitments are primarily for railcars, but also include logistics, manufacturing, storage, real estate and information technology assets. Our leases have remaining lease terms of up to 94 years, some of which may include options to extend the leases for up to five years, and some of which may include options to terminate the leases within one year.

The amounts for leases included in our consolidated balance sheet include:

		December 31,	
		2020	2019
Lease assets:	Balance sheet location:	($ in millions)	
Operating	Operating lease assets, net	$ 360.7	$ 377.8
Finance	Property, plant and equipment, less accumulated depreciation(1)	4.5	5.4
Total lease assets		$ 365.2	$ 383.2
Lease liabilities:			
Current			
Operating	Current operating lease liabilities	$ 74.7	$ 79.3
Finance	Current installments of long-term debt	1.3	2.1
Long-term			
Operating	Operating lease liabilities	291.6	303.4
Finance	Long-term debt	3.0	3.2
Total lease liabilities		$ 370.6	$ 388.0

(1) As of December 31, 2020, assets recorded under finance leases were $8.0 million and accumulated depreciation associated with finance leases was $3.5 million.

The components of lease expense are recorded to cost of goods sold and selling and administration expenses in the consolidated statement of operations, excluding interest on finance lease liabilities which is recorded to interest expense. The components of lease expense were as follows:

	Years Ended December 31,	
	2020	2019
Lease expense:	($ in millions)	
Operating	$ 96.0	$ 93.6
Other operating lease expense(1)	24.3	27.5
Finance:		
Depreciation of leased assets	1.3	1.3
Interest on lease liabilities	0.2	0.2
Total lease expense	$ 121.8	$ 122.6

(1) Includes costs associated with short-term leases and variable lease expenses.

The maturities of lease liabilities were as follows:

	December 31, 2020		
	Operating leases	Finance leases	Total
	($ in millions)		
2021	$ 83.6	$ 1.4	$ 85.0
2022	66.9	1.2	68.1
2023	52.6	1.0	53.6
2024	41.5	0.8	42.3
2025	33.7	0.2	33.9
Thereafter	148.4	—	148.4
Total lease payments	426.7	4.6	431.3
Less: Imputed interest[1]	(60.4)	(0.3)	(60.7)
Present value of lease liabilities	$ 366.3	$ 4.3	$ 370.6

(1) Calculated using the discount rate for each lease.

Other information related to leases was as follows:

	Years Ended December 31,	
	2020	2019
Supplemental cash flows information:	($ in millions)	
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$ 95.9	$ 93.4
Operating cash flows from finance leases	0.2	0.2
Financing cash flows from finance leases	2.1	1.4
Non-cash increase in lease assets and lease liabilities:		
Operating leases	$ 70.5	$ 176.1
Finance leases	1.1	2.5

	December 31,	
Weighted-average remaining lease term:	2020	2019
Operating leases	9.5 years	9.4 years
Finance leases	3.1 years	3.2 years
Weighted-average discount rate:		
Operating leases	3.0 %	3.1 %
Finance leases	3.3 %	3.3 %

As of December 31, 2020, we have additional operating leases for railcars that have not yet commenced of approximately $64 million which are expected to commence during 2021 with lease terms between 2 years and 15 years. We also have additional operating leases for logistics equipment that have not yet commenced of approximately $5 million which are expected to commence during 2021 with lease terms of 15 years.

NOTE 23. COMMITMENTS AND CONTINGENCIES

The following table summarizes our contractual commitments under purchase contracts as of December 31, 2020:

	Purchase Commitments
	($ in millions)
2021	$ 722.8
2022	657.4
2023	657.4
2024	651.3
2025	541.2
Thereafter	2,390.6
Total commitments	$ 5,620.7

The above purchase commitments include raw material, capital expenditure and utility purchasing commitments utilized in our normal course of business for our projected needs. In connection with the Acquisition, certain additional agreements have been entered into with Dow, including, long-term purchase agreements for raw materials. These agreements are maintained through long-term cost based contracts that provide us with a reliable supply of key raw materials. Key raw materials received from Dow include ethylene, electricity, propylene and benzene.

Legal Matters

Olin, K.A. Steel Chemicals (a wholly owned subsidiary of Olin) and other alleged caustic soda producers were named as defendants in six purported class action civil lawsuits filed March 22, 25 and 26, 2019 and April 12, 2019 in the U.S. District Court for the Western District of New York on behalf of the respective named plaintiffs and a putative class comprised of all persons and entities who purchased caustic soda in the U.S. directly from one or more of the defendants, their parents, predecessors, subsidiaries or affiliates at any time on or after October 1, 2015. Olin, K.A. Steel Chemicals and other caustic soda producers were also named as defendants in two purported class action civil lawsuits filed July 25 and 29, 2019 in the U.S. District Court for the Western District of New York on behalf of the respective named plaintiffs and a putative class comprised of all persons and entities who purchased caustic soda in the U.S. indirectly from distributors at any time on or after October 1, 2015. The other defendants named in the lawsuits are Occidental Petroleum Corporation, Occidental Chemical Corporation d/b/a OxyChem, Westlake Chemical Corporation, Shin-Etsu Chemical Co., Ltd., Shintech Incorporated, Formosa Plastics Corporation, and Formosa Plastics Corporation, U.S.A. The lawsuits allege the defendants conspired to fix, raise, maintain and stabilize the price of caustic soda, restrict domestic (U.S.) supply of caustic soda and allocate caustic soda customers. Plaintiffs seek an unspecified amount of damages and injunctive relief.

Olin, K.A. Steel Chemical, Olin Canada ULC, 3229897 Nova Scotia Co. (wholly owned subsidiaries of Olin) and other alleged caustic soda producers were named as defendants in a proposed class action civil lawsuit filed on October 7, 2020 in the Quebec Superior Court (Province of Quebec) on behalf of the respective named plaintiff and a putative class comprised of all Canadian persons and entities who, between October 1, 2015 and the date of the eventual class action certification, directly or indirectly purchased caustic soda or products containing caustic soda, produced by one or more of the defendants. Olin, K.A. Steel Chemical, Olin Canada ULC, 3229897 Nova Scotia Co. and other alleged caustic soda producers were also named as defendants in a proposed class action civil lawsuit filed November 13, 2020 in the Federal Court of Canada on behalf of the respective named plaintiff and a putative class comprised of all legal persons in Canada who, at any time on or after October 1, 2015 to the present, directly or indirectly purchased caustic soda. The other defendants named in the two Canadian lawsuits are Occidental Petroleum Corporation, Occidental Chemical Corporation, Oxy Canada Sales, Inc., Westlake Chemical Corporation, Axiall Canada, Inc., Shin-Etsu Chemical Co., Ltd., Shintech Incorporated, Formosa Plastics Corporation, and Formosa Plastics Corporation, U.S.A. The lawsuits allege the defendants conspired to fix, raise, maintain control, and stabilize the price of caustic soda, divide and allocate markets, sales, customers and territories, fix, maintain, control, prevent, restrict, lessen or eliminate production and supply of caustic soda, and agree to idle capacity of production and/or refrain from increasing their production capacity. Plaintiffs seek an unspecified amount of damages, including punitive damages.

We believe we have meritorious legal positions and will continue to represent our interests vigorously in these matters. Any losses related to these matters are not currently estimable because of unresolved questions of fact and law, but if resolved unfavorably to Olin, could have a material adverse effect on our financial position, cash flows or results of operations.

We, and our subsidiaries, are defendants in various other legal actions (including proceedings based on alleged exposures to asbestos) incidental to our past and current business activities. At December 31, 2020 and 2019, our consolidated balance sheets included liabilities for these other legal actions of $13.5 million and $12.4 million, respectively. These liabilities do not include costs associated with legal representation. Based on our analysis, and considering the inherent uncertainties associated with litigation, we do not believe that it is reasonably possible that these other legal actions will materially adversely affect our financial position, cash flows or results of operations.

During the ordinary course of our business, contingencies arise resulting from an existing condition, situation or set of circumstances involving an uncertainty as to the realization of a possible gain contingency. In certain instances such as environmental projects, we are responsible for managing the clean-up and remediation of an environmental site. There exists the possibility of recovering a portion of these costs from other parties. We account for gain contingencies in accordance with the provisions of ASC 450 "Contingencies" and therefore do not record gain contingencies and recognize income until it is earned and realizable.

For the year ended December 31, 2018, we recognized an insurance recovery of $8.0 million in other operating income for a second quarter 2017 business interruption at our Freeport, TX vinyl chloride monomer facility.

NOTE 24. DERIVATIVE FINANCIAL INSTRUMENTS

We are exposed to market risk in the normal course of our business operations due to our purchases of certain commodities, our ongoing investing and financing activities and our operations that use foreign currencies. The risk of loss can be assessed from the perspective of adverse changes in fair values, cash flows and future earnings. We have established policies and procedures governing our management of market risks and the use of financial instruments to manage exposure to such risks. ASC 815 requires an entity to recognize all derivatives as either assets or liabilities in the consolidated balance sheets and measure those instruments at fair value. In accordance with ASC 815, we designate derivative contracts as cash flow hedges of forecasted purchases of commodities and forecasted interest payments related to variable-rate borrowings and designate certain interest rate swaps as fair value hedges of fixed-rate borrowings. We do not enter into any derivative instruments for trading or speculative purposes.

Energy costs, including electricity and natural gas, and certain raw materials used in our production processes are subject to price volatility. Depending on market conditions, we may enter into futures contracts, forward contracts, commodity swaps and put and call option contracts in order to reduce the impact of commodity price fluctuations. The majority of our commodity derivatives expire within one year.

We actively manage currency exposures that are associated with net monetary asset positions, currency purchases and sales commitments denominated in foreign currencies and foreign currency denominated assets and liabilities created in the normal course of business. We enter into forward sales and purchase contracts to manage currency risk to offset our net exposures, by currency, related to the foreign currency denominated monetary assets and liabilities of our operations. At December 31, 2020, we had outstanding forward contracts to buy foreign currency with a notional value of $169.9 million and to sell foreign currency with a notional value of $113.6 million. All of the currency derivatives expire within one year and are for USD equivalents. The counterparties to the forward contracts are large financial institutions; however, the risk of loss to us in the event of nonperformance by a counterparty could impact our financial position or results of operations. At December 31, 2019, we had outstanding forward contracts to buy foreign currency with a notional value of $140.6 million and to sell foreign currency with a notional value of $99.2 million.

Cash Flow Hedges

For derivative instruments that are designated and qualify as a cash flow hedge, the change in fair value of the derivative is recognized as a component of other comprehensive income (loss) until the hedged item is recognized in earnings.

We had the following notional amounts of outstanding commodity contracts that were entered into to hedge forecasted purchases:

	December 31,			
	2020		2019	
	($ in millions)			
Natural gas	$	74.1	$	62.9
Ethane		51.8		51.5
Metals		88.2		60.2
Total notional	$	214.1	$	174.6

As of December 31, 2020, the counterparties to these commodity contracts were Wells Fargo Bank, N.A., Citibank, N.A., JPMorgan Chase Bank, National Association, Intesa Sanpaolo S.p.A. and Bank of America Corporation, all of which are major financial institutions.

We use cash flow hedges for certain raw material and energy costs such as copper, zinc, lead, ethane, electricity and natural gas to provide a measure of stability in managing our exposure to price fluctuations associated with forecasted purchases of raw materials and energy used in our manufacturing process. At December 31, 2020, we had open derivative contract positions through 2027. If all open futures contracts had been settled on December 31, 2020, we would have recognized a pretax gain of $28.4 million.

If commodity prices were to remain at December 31, 2020 levels, approximately $16.6 million of deferred gains, net of tax, would be reclassified into earnings during the next twelve months. The actual effect on earnings will be dependent on actual commodity prices when the forecasted transactions occur.

We use interest rate swaps as a means of minimizing cash flow fluctuations that may arise from volatility in interest rates of our variable-rate borrowings. In July 2019, we terminated the remaining interest rate swaps designated as cash flow hedges which resulted in a gain of $1.8 million that was recognized in interest expense for the year ended December 31, 2019. For the years ended December 31, 2019 and 2018, $4.3 million and $8.9 million, respectively, of income was recorded to interest expense on the accompanying consolidated statements of operations related to these swap agreements.

Fair Value Hedges

We use interest rate swaps as a means of managing interest expense and floating interest rate exposure to optimal levels. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative as well as the offsetting loss or gain on the hedged item attributable to the hedged risk are recognized in current earnings. We include the gain or loss on the hedged items (fixed-rate borrowings) in the same line item, interest expense, as the offsetting loss or gain on the related interest rate swaps.

In August 2019, we terminated the interest rate swaps designated as fair value hedges which resulted in a loss of $2.3 million that will be deferred as an offset to the carrying value of the related debt and will be recognized to interest expense through October 2025. For the years ended December 31, 2020, 2019 and 2018, $0.4 million, $2.6 million and $2.1 million, respectively, of expense was recorded to interest expense on the accompanying consolidated statements of operations related to these swap agreements.

Financial Statement Impacts

We present our derivative assets and liabilities in our consolidated balance sheets on a net basis whenever we have a legally enforceable master netting agreement with the counterparty to our derivative contracts. We use these agreements to manage and substantially reduce our potential counterparty credit risk.

The following table summarizes the location and fair value of the derivative instruments on our consolidated balance sheets. The table disaggregates our net derivative assets and liabilities into gross components on a contract-by-contract basis before giving effect to master netting arrangements:

	December 31,	
	2020	***2019***
Asset Derivatives:	*($ in millions)*	
Other current assets		
Derivatives designated as hedging instruments:		
Commodity contracts - gains	$ 25.0	$ 1.8
Commodity contracts - losses	(3.1)	(0.5)
Derivatives not designated as hedging instruments:		
Foreign exchange contracts - gains	2.5	1.1
Foreign exchange contracts - losses	(0.2)	(0.5)
Total other current assets	24.2	1.9
Other assets		
Derivatives designated as hedging instruments:		
Commodity contracts - gains	7.4	0.8
Commodity contracts - losses	(0.2)	(0.1)
Total other assets	7.2	0.7
Total Asset Derivatives(1)	$ 31.4	$ 2.6
Liability Derivatives:		
Accrued liabilities		
Derivatives designated as hedging instruments:		
Commodity contracts - losses	$ 1.4	$ 18.0
Commodity contracts - gains	(1.3)	(0.2)
Derivatives not designated as hedging instruments:		
Foreign exchange contracts - losses	—	1.4
Foreign exchange contracts - gains	—	(0.2)
Total accrued liabilities	0.1	19.0
Other liabilities		
Derivatives designated as hedging instruments:		
Commodity contract - losses	0.8	1.8
Commodity contract - gains	(0.2)	—
Total other liabilities	0.6	1.8
Total Liability Derivatives(1)	$ 0.7	$ 20.8

(1) Does not include the impact of cash collateral received from or provided to counterparties.

The following table summarizes the effects of derivative instruments on our consolidated statements of operations:

	Location of Gain (Loss)	Amount of Gain (Loss) Years Ended December 31, 2020	2019	2018
Derivatives – Cash Flow Hedges		($ in millions)		
Recognized in other comprehensive loss:				
Commodity contracts	———	$ 31.1	$ (46.1)	$ (4.8)
Interest rate contracts	———	—	(1.0)	3.7
		$ 31.1	$ (47.1)	$ (1.1)
Reclassified from accumulated other comprehensive loss into income:				
Interest rate contracts	Interest expense	$ —	$ 4.3	$ 8.9
Commodity contracts	Cost of goods sold	(14.9)	(31.1)	5.4
		$ (14.9)	$ (26.8)	$ 14.3
Derivatives – Fair Value Hedges				
Interest rate contracts	Interest expense	$ (0.4)	$ (2.6)	$ (2.1)
Derivatives Not Designated as Hedging Instruments				
Foreign exchange contracts	Selling and administration	$ 17.7	$ (4.0)	$ (5.4)

Credit Risk and Collateral

By using derivative instruments, we are exposed to credit and market risk. If a counterparty fails to fulfill its performance obligations under a derivative contract, our credit risk will equal the fair value gain in a derivative. Generally, when the fair value of a derivative contract is positive, this indicates that the counterparty owes us, thus creating a repayment risk for us. When the fair value of a derivative contract is negative, we owe the counterparty and, therefore, assume no repayment risk. We minimize the credit (or repayment) risk in derivative instruments by entering into transactions with high-quality counterparties. We monitor our positions and the credit ratings of our counterparties, and we do not anticipate non-performance by the counterparties.

Based on the agreements with our various counterparties, cash collateral is required to be provided when the net fair value of the derivatives, with the counterparty, exceeds a specific threshold. If the threshold is exceeded, cash is either provided by the counterparty to us if the value of the derivatives is our asset, or cash is provided by us to the counterparty if the value of the derivatives is our liability. As of December 31, 2020 and 2019, this threshold was not exceeded. In all instances where we are party to a master netting agreement, we offset the receivable or payable recognized upon payment of cash collateral against the fair value amounts recognized for derivative instruments that have also been offset under such master netting agreements.

NOTE 25. FAIR VALUE MEASUREMENTS

Assets and liabilities recorded at fair value in the consolidated balance sheets are categorized based upon the level of judgment associated with the inputs used to measure their fair value. Hierarchical levels are directly related to the amount of subjectivity associated with the inputs to fair valuation of these assets and liabilities. We are required to separately disclose assets and liabilities measured at fair value on a recurring basis, from those measured at fair value on a nonrecurring basis. Nonfinancial assets measured at fair value on a nonrecurring basis are intangible assets and goodwill, which are reviewed for impairment annually in the fourth quarter and/or when circumstances or other events indicate that impairment may have occurred. Determining which hierarchical level an asset or liability falls within requires significant judgment. The following table summarizes the assets and liabilities measured at fair value in the consolidated balance sheets:

Balance at December 31, 2020	*Quoted Prices in Active Markets for Identical Assets (Level 1)*	*Significant Other Observable Inputs (Level 2)*	*Significant Unobservable Inputs (Level 3)*	*Total*
Assets		*($ in millions)*		
Commodity contracts	$ —	$ 29.1	$ —	$ 29.1
Foreign exchange contracts	—	2.3	—	2.3
Total Assets	$ —	$ 31.4	$ —	$ 31.4
Liabilities				
Commodity contracts	$ —	$ 0.7	$ —	$ 0.7
Total Liabilities	$ —	$ 0.7	$ —	$ 0.7
Balance at December 31, 2019				
Assets				
Commodity contracts	$ —	$ 2.0	$ —	$ 2.0
Foreign exchange contracts	—	0.6	—	0.6
Total Assets	$ —	$ 2.6	$ —	$ 2.6
Liabilities				
Commodity contracts	$ —	$ 19.6	$ —	$ 19.6
Foreign exchange contracts	—	1.2	—	1.2
Total Liabilities	$ —	$ 20.8	$ —	$ 20.8

Commodity Contracts

Commodity contract financial instruments were valued primarily based on prices and other relevant information observable in market transactions involving identical or comparable assets or liabilities including both forward and spot prices for commodities. We use commodity derivative contracts for certain raw materials and energy costs such as copper, zinc, lead, ethane, electricity and natural gas to provide a measure of stability in managing our exposure to price fluctuations.

Foreign Currency Contracts

Foreign currency contract financial instruments were valued primarily based on relevant information observable in market transactions involving identical or comparable assets or liabilities including both forward and spot prices for currencies. We enter into forward sales and purchase contracts to manage currency risk resulting from purchase and sale commitments denominated in foreign currencies.

Financial Instruments

The carrying values of cash and cash equivalents, accounts receivable and accounts payable approximated fair values due to the short-term maturities of these instruments. Since our long-term debt instruments may not be actively traded, the inputs used to measure the fair value of our long-term debt are based on current market rates for debt of similar risk and maturities and is classified as Level 2 in the fair value measurement hierarchy. The following table summarizes the fair value measurements of debt and the actual debt recorded on our balance sheets:

	Fair Value Measurements				Amount recorded on balance sheets
	Level 1	Level 2	Level 3	Total	
	($ in millions)				
Balance at December 31, 2020	$ —	$ 4,177.2	$ —	$ 4,177.2	$ 3,863.8
Balance at December 31, 2019	—	3,572.7	—	3,572.7	3,340.8

Nonrecurring Fair Value Measurements

In addition to assets and liabilities that are recorded at fair value on a recurring basis, we record assets and liabilities at fair value on a nonrecurring basis as required by ASC 820. For the three months ended September 30, 2020, the carrying value of the Chlor Alkali Products and Vinyls and Epoxy reporting units' goodwill was remeasured to fair value on a nonrecurring basis. The fair value of each reporting unit was calculated utilizing an income approach. The income approach uses a discounted cash flow model that requires various observable and nonobservable inputs, such as prices, volumes, expenses, capital expenditures, discount rates and projected long-term growth rates and terminal values. The resulting fair value Level 3 estimates were less than the reporting units' carrying value which resulted in pre-tax goodwill impairment charge of $699.8 million. As part of our impairment analysis, the fair value of all reporting units was reconciled to the company's market capitalization. See Note 11 "Goodwill and Intangibles" for additional information on the goodwill impairment. There were no other assets measured at fair value on a nonrecurring basis as of, or for the years ended, December 31, 2020 and 2019.

NOTE 26. OTHER FINANCIAL DATA

Quarterly Data (Unaudited)

($ in millions, except per share data)

2020	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
Sales	$ 1,425.1	$ 1,241.2	$ 1,437.6	$ 1,654.1	$ 5,758.0
Cost of goods sold	1,374.2	1,235.7	1,307.4	1,457.3	5,374.6
Net loss	(80.0)	(120.1)	(736.8)	(33.0)	(969.9)
Net loss per common share:					
Basic	(0.51)	(0.76)	(4.67)	(0.21)	(6.14)
Diluted	(0.51)	(0.76)	(4.67)	(0.21)	(6.14)
Common dividends per share	0.20	0.20	0.20	0.20	0.80

2019	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
Sales	$ 1,553.4	$ 1,592.9	$ 1,576.6	$ 1,387.1	$ 6,110.0
Cost of goods sold	1,347.3	1,463.7	1,357.6	1,270.6	5,439.2
Net income (loss)	41.7	(20.0)	44.2	(77.2)	(11.3)
Net income (loss) per common share:					
Basic	0.25	(0.12)	0.27	(0.49)	(0.07)
Diluted	0.25	(0.12)	0.27	(0.49)	(0.07)
Common dividends per share	0.20	0.20	0.20	0.20	0.80

Item 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

Item 9A. CONTROLS AND PROCEDURES

Our chief executive officer and our chief financial officer evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2020. Based on that evaluation, our chief executive officer and chief financial officer have concluded that, as of such date, our disclosure controls and procedures were effective to ensure that information Olin is required to disclose in the reports that it files or submits with the SEC under the Securities Exchange Act of 1934 is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms, and to ensure that information we are required to disclose in such reports is accumulated and communicated to our management, including our chief executive officer and chief financial officer, as appropriate to allow timely decisions regarding required disclosure.

There have been no changes in our internal control over financial reporting that occurred during the quarter ended December 31, 2020, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Management's report on internal control over financial reporting and the related report of Olin's independent registered public accounting firm, KPMG LLP, are included in Item 8—"Consolidated Financial Statements and Supplementary Data."

Item 9B. OTHER INFORMATION

Not applicable.

PART III

Item 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

We incorporate the biographical information relating to our Directors under the heading ITEM 1—"PROPOSAL FOR THE ELECTION OF DIRECTORS" in our Proxy Statement relating to our 2021 Annual Meeting of Shareholders (the "Proxy Statement") by reference in this Report. We incorporate the biographical information regarding executive officers under the heading "EXECUTIVE OFFICERS" in our Proxy Statement by reference in this report. We incorporate the information regarding compliance with Section 16 of the Securities Exchange Act of 1934, as amended, under the heading entitled "DELINQUENT SECTION 16(a) REPORTS" in our Proxy Statement by reference in this Report.

The information with respect to our audit committee, including the audit committee financial expert, is incorporated by reference in this Report to the information contained in the paragraph entitled "CORPORATE GOVERNANCE MATTERS—What Are the Committees of our Board?" in our Proxy Statement. We incorporate by reference in this Report information regarding procedures for shareholders to nominate a director for election, in the Proxy Statement under the headings "MISCELLANEOUS—How can I directly nominate a director for election to the board at the 2022 annual meeting?" and "CORPORATE GOVERNANCE MATTERS—What Is Olin's Director Nomination Process?".

We have adopted a code of business conduct and ethics for directors, officers and employees, known as the Code of Conduct. The Code of Conduct is available in the About, Our Values section of our website at www.olin.com. Olin intends to satisfy disclosure requirements under Item 5.05 of Form 8-K regarding an amendment to, or waiver from, any provision of the Code of Conduct with respect to its executive officers or directors by posting such amendment or waiver on its website.

Item 11. EXECUTIVE COMPENSATION

The information in the Proxy Statement under the heading "CORPORATE GOVERNANCE MATTERS—Compensation Committee Interlocks and Insider Participation," and the information under the heading "COMPENSATION DISCUSSION AND ANALYSIS" through the information under the heading "COMPENSATION COMMITTEE REPORT," are incorporated by reference in this Report.

Item 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

We incorporate the information concerning holdings of our common stock by certain beneficial owners contained under the heading "CERTAIN BENEFICIAL OWNERS" in our Proxy Statement, and the information concerning beneficial ownership of our common stock by our directors and officers under the heading "SECURITY OWNERSHIP OF DIRECTORS AND OFFICERS" in our Proxy Statement by reference in this Report. We also incorporate the table entitled "EQUITY COMPENSATION PLAN INFORMATION" included under the heading ITEM 2—"PROPOSAL TO APPROVE THE OLIN CORPORATION 2021 LONG TERM INCENTIVE PLAN" in our Proxy Statement by reference in this Report.

Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

We incorporate the information under the headings "CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS" and "CORPORATE GOVERNANCE MATTERS—Which Board Members Are Independent?" in our Proxy Statement by reference in this Report.

Item 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

We incorporate the information concerning the accounting fees and services of our independent registered public accounting firm, KPMG LLP, under the heading ITEM 4—"PROPOSAL TO RATIFY APPOINTMENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM" in our Proxy Statement by reference in this Report.

PART IV

Item 15. EXHIBITS AND CONSOLIDATED FINANCIAL STATEMENT SCHEDULES

(a) 1. **Consolidated Financial Statements**

Consolidated financial statements of the registrant are included in Item 8 above.

2. **Financial Statement Schedules**

Schedules not included herein are omitted because they are inapplicable or not required or because the required information is given in the consolidated financial statements and notes thereto.

3. **Exhibits**

The following exhibits are filed with this Annual Report on Form 10-K, unless incorporated by reference. Management contracts and compensatory plans and arrangements are listed as Exhibits 10.1 through 10.25. We are party to a number of other instruments defining the rights of holders of long-term debt. No such instrument authorizes an amount of securities in excess of 10% of the total assets of Olin and its subsidiaries on a consolidated basis. Olin agrees to furnish a copy of each instrument to the Commission upon request.

Exhibit	Exhibit Description
1	Underwriting Agreement dated as of July 11, 2019, between Olin Corporation and J.P. Morgan Securities LLC, as representative of the several underwriters named therein—Exhibit 1.1 to Olin's Form 8-K filed July 16, 2019*
2	Merger Agreement dated as of March 26, 2015, among The Dow Chemical Company, Blue Cube Spinco Inc., Olin Corporation and Blue Cube Acquisition Corp.—Exhibit 2.1 to Olin's Form 8-K filed March 27, 2015*
3.1	Amended and Restated Articles of Incorporation of Olin Corporation as amended effective April 24, 2020—Exhibit 3.1 to Olin's Form 8-K filed April 28, 2020*
3.2	Bylaws of Olin Corporation as amended effective April 23, 2020—Exhibit 3.2 to Olin's Form 8-K filed April 28, 2020*
4.1	Description of Olin Corporation Securities registered under Section 12 of the Exchange Act
4.2	Trust Indenture effective October 1, 2010 between The Industrial Development Authority of Washington County and U.S. Bank National Association, as trustee —Exhibit 4.1 to Olin's Form 8-K filed October 20, 2010*
4.3	Loan Agreement effective October 1, 2010 between The Industrial Development Authority of Washington County and Olin Corporation—Exhibit 4.2 to Olin's Form 8-K filed October 20, 2010*
4.4	Bond Purchase Agreement dated October 14, 2010 between The Industrial Development Authority of Washington County, Olin Corporation and PNC Bank, National Association, as administrative agent—Exhibit 4.3 to Olin's Form 8-K filed October 20, 2010*
4.5	Trust Indenture effective December 1, 2010 between Mississippi Business Finance Corporation and U.S. Bank National Association—Exhibit 4.1 to Olin's Form 8-K filed December 10, 2010*
4.6	Second Supplemental Indenture dated as of August 9, 2012 between Olin Corporation, The Bank of New York Mellon Trust Company, N.A. and U.S. Bank National Association—Exhibit 4.1 to Olin's Form 8-K filed August 9, 2012*
4.7	Third Supplemental Indenture dated as of August 22, 2012 between Olin Corporation and U.S. Bank National Association—Exhibit 4.1 to Olin's Form 8-K filed August 22, 2012*
4.8	Fourth Supplemental Indenture dated as of March 9, 2017 between Olin Corporation and U.S. Bank National Association—Exhibit 4.3 to Olin's Form 8-K filed March 9, 2017*
4.9	Fifth Supplemental Indenture dated January 16, 2018 between Olin Corporation and U.S. Bank National Association, as trustee, governing the Senior Notes—Exhibit 4.1 to Olin's Form 8-K filed January 19, 2018*
4.10	Sixth Supplemental Indenture dated July 16, 2019 between Olin Corporation and U.S. Bank National Association, as trustee, governing the Senior Notes—Exhibit 4.1 to Olin's Form 8-K filed July 16, 2019*
4.11	Seventh Supplemental Indenture dated September 30, 2020 between Olin Corporation and U. S. Bank National Association, as trustee, governing the Senior Notes—Exhibit 4.1 to Olin's Form 10-Q filed November 5, 2020*
4.12	Loan Agreement effective December 1, 2010 between Mississippi Business Finance Corporation and Olin Corporation—Exhibit 4.2 to Olin's Form 8-K filed December 10, 2010*
4.13	Bond Purchase Agreement dated December 9, 2010 between Mississippi Business Finance Corporation, Olin Corporation and PNC Bank, National Association, as administrative agent—Exhibit 4.3 to Olin's Form 8-K filed December 10, 2010*

4.14	Amended and Restated Credit and Funding Agreement dated December 9, 2010 between Olin Corporation, as borrower; PNC Bank, National Association, as administrative agent; PNC Capital Markets LLC, as lead arranger; and the Lenders party thereto—Exhibit 4.4 to Olin's Form 8-K filed December 10, 2010*
4.15	First Amendment dated December 27, 2010 to the Amended and Restated Credit and Funding Agreement dated December 9, 2010 between Olin Corporation, as borrower; PNC Bank, National Association, as administrative agent; PNC Capital Markets LLC, as lead arranger; and the Lenders party thereto—Exhibit 4.4 to Olin's Form 8-K filed December 30, 2010*
4.16	Second Amendment dated April 27, 2012 to Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent for the Lenders—Exhibit 4.2 to Olin's Form 8-K filed May 3, 2012*
4.17	Third Amendment dated June 23, 2014 to Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent for the Lenders—Exhibit 4.2 to Olin's Form 8-K filed June 25, 2014*
4.18	Amendment No. 4 dated June 23, 2015 to the Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent—Exhibit 10.3 to Olin's Form 8-K filed June 29, 2015*
4.19	Fifth Amendment dated September 29, 2016 to Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent for the Lenders—Exhibit 4.1 to Olin's Form 10-Q filed May 3, 2017*
4.20	Sixth Amendment dated March 9, 2017 to Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent for the Lenders—Exhibit 4.2 to Olin's Form 8-K filed March 9, 2017*
4.21	Seventh Amendment dated July 16, 2019 to Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent for the Lenders—Exhibit 4.3 to Olin's Form 8-K filed July 16, 2019*
4.22	Eighth Amendment dated December 20, 2019 to Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent for the Lenders—Exhibit 4.1 to Olin's Form 8-K filed December 20, 2019*
4.23	Ninth Amendment dated May 8, 2020 to Amended and Restated Credit and Funding Agreement dated December 9, 2010 among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent for the Lenders—Exhibit 4.1 to Olin's Form 8-K filed May 11, 2020*
4.24	Form of 5.50% Senior Notes due 2022—Exhibit 4.2 to Olin's Form 8-K filed August 22, 2012*
4.25	Forward Purchase Agreement dated as of March 9, 2017, among Olin Corporation, the Lenders as named therein, and PNC Bank, National Association, as administrative agent—Exhibit 4.1 to Olin's Form 8-K filed March 9, 2017*
4.26	Senior Notes Indenture dated October 5, 2015 between Blue Cube Spinco Inc., as issuer, and U.S. Bank National Association, as trustee, governing the 9.75% Senior Notes due 2023—Exhibit 4.1 to Olin's Form 8-K filed October 5, 2015*
4.27	Senior Notes Indenture dated October 5, 2015 between Blue Cube Spinco Inc., as issuer, and U.S. Bank National Association, as trustee, governing the 10.00% Senior Notes due 2025—Exhibit 4.2 to Olin's Form 8-K filed October 5, 2015*
4.28	First Supplemental Indenture dated October 5, 2015 between Blue Cube Spinco Inc., as issuer, and Olin Corporation, as guarantor, and U.S. Bank National Association, as trustee, governing the 9.75% Senior Notes due 2023—Exhibit 4.3 to Olin's Form 8-K filed October 5, 2015*
4.29	Second Supplemental Indenture dated September 18, 2020 between Blue Cube Spinco LLC, as issuer, and Olin Corporation, as guarantor, and U.S. Bank National Association, as trustee, governing the 9.75% Senior Notes due 2023—Exhibit 4.2 to Olin's Form 10-Q filed November 5, 2020*
4.30	First Supplemental Indenture dated October 5, 2015 between Blue Cube Spinco Inc., as issuer, and Olin Corporation, as guarantor, and U.S. Bank National Association, as trustee, governing the 10.00% Senior Notes due 2025—Exhibit 4.4 to Olin's Form 8-K filed October 5, 2015*
4.31	Second Supplemental Indenture dated September 18, 2020 between Blue Cube Spinco LLC, as issuer, and Olin Corporation, as guarantor, and U.S. Bank National Association, as trustee, governing the 10.00% Senior Notes due 2025—Exhibit 4.3 to Olin's Form 10-Q filed November 5, 2020*
4.32	Senior Notes Indenture dated May 19, 2020 among Olin Corporation, as issuer, and U.S. Bank National Association, as trustee, governing the Senior Notes—Exhibit 4.1 to Olin's Form 8-K filed May 20, 2020*
4.33	First Supplemental Indenture dated September 30, 2020 between Olin Corporation, as issuer, as issuer, and U.S. Bank National Association, as trustee, governing the 9.500% Senior Notes due 2025—Exhibit 4.4 to Olin's Form 10-Q filed November 5, 2020*
4.34	Form of 9.75% Senior Notes due 2023—Exhibit 4.5 (included in Exhibit 4.1) to Olin's Form 8-K filed October 5, 2015*

4.35	Form of 10.00% Senior Notes due 2025—Exhibit 4.6 (included in Exhibit 4.2) to Olin's Form 8-K filed October 5, 2015*
4.36	Form of 5.125% Senior Notes due 2027—Exhibit 4.4 (included in Exhibit 4.3) to Olin's Form 8-K filed March 9, 2017*
4.37	Form of 5.000% Senior Notes due 2030—Exhibit 4.1 to Olin's Form 8-K filed January 19, 2018*
4.38	Form of 5.625% Senior Notes due 2029—Exhibit 4.2 (included in Exhibit 4.1) to Olin's Form 8-K filed July 16, 2019*
4.39	Form of 9.500% Senior Notes due 2025—Exhibit 4.2 (included in Exhibit 4.1) to Olin's Form 8-K filed May 20, 2020*
4.40	Registration Rights Agreement dated October 5, 2015 relating to the 9.75% Senior Notes due 2023 and 10.00% Senior Notes due 2025 by and among Blue Cube Spinco Inc., Olin Corporation, J.P. Morgan Securities LLC and Wells Fargo Securities LLC for themselves and as representatives of other initial purchasers—Exhibit 4.7 to Olin's Form 8-K filed October 5, 2015*
4.41	Receivables Financing Arrangement dated December 20, 2016 by and among Olin Corporation, Olin Finance Company, LLC, PNC Bank, National Association, PNC Capital Markets LLC and the Lender parties thereto—Exhibit 4(x) to Olin's Form 10-K filed February 28, 2017*
4.42	Amendment No. 1 dated July 16, 2019 to Receivables Financing Arrangement and Reaffirmation of Performance Guaranty dated December 20, 2016 among Olin Corporation, Olin Finance Company, LLC, PNC Bank, National Association, PNC Capital Markets LLC and the Lender parties thereto—Exhibit 10.2 to Olin's Form 8-K filed July 16, 2019*
4.43	Amendment No. 2 dated March 27, 2020 to Receivables Financing Arrangement and Reaffirmation of Performance Guaranty dated December 20, 2016 among Olin Corporation, Olin Finance Company, LLC, PNC Bank, National Association, PNC Capital Markets LLC and the Lender parties thereto—Exhibit 10.1 to Olin's Form 8-K filed March 27, 2020*
4.44	Amendment No. 3 dated April 23, 2020 to Receivables Financing Arrangement and Reaffirmation of Performance Guaranty dated December 20, 2016 among Olin Corporation, Olin Finance Company, LLC, PNC Bank, National Association, PNC Capital Markets LLC and the Lender parties thereto—Exhibit 10.1 to Olin's Form 8-K filed April 23, 2020*
4.45	Amendment No. 4 dated May 8, 2020 to Receivables Financing Arrangement and Reaffirmation of Performance Guaranty dated December 20, 2016 among Olin Corporation, Olin Finance Company, LLC, PNC Bank, National Association, PNC Capital Markets LLC and the Lender parties thereto—Exhibit 10.2 to Olin's Form 8-K filed May 11, 2020*
4.46	Amendment No. 5 dated December 28, 2020 to Receivables Financing Arrangement and Reaffirmation of Performance Guaranty dated December 20, 2016 among Olin Corporation, Olin Finance Company, LLC, PNC Bank, National Association, PNC Capital Markets LLC and the Lender parties thereto
10.1	Senior Executive Pension Plan amended and restated effective October 24, 2008—Exhibit 10.1 to Olin's Form 10-Q filed October 27, 2008*
10.2	Supplemental Contributing Employee Ownership Plan as amended and restated effective January 1, 2018—Exhibit 99.1 to Olin's Form 8-K filed December 12, 2017*
10.3	Olin Corporation Change in Control Severance Plan for Section 16(b) Officers effective January 27, 2019—Exhibit 10.1 to Olin's Form 8-K filed December 14, 2018*
10.4	Olin Corporation Severance Plan for Section 16(b) Officers effective January 27, 2019—Exhibit 10.2 to Olin's Form 8-K filed December 14, 2018*
10.5	Amended and Restated 1997 Stock Plan for Non-employee Directors codified to reflect amendments adopted through January 1, 2020—Exhibit 10(f) to Olin's Form 10-K filed February 25, 2020*
10.6	Description of Restricted Stock Unit Awards granted under one of Olin's Long Term Incentive Plans
10.7	Supplementary and Deferral Benefit Pension Plan as amended and restated effective October 24, 2008—Exhibit 10.2 to Olin's Form 10-Q filed October 27, 2008*
10.8	Amended and Restated Olin Corporation 2000 Long Term Incentive Plan codified as of January 27, 2019—Exhibit 10.1 to Olin's Form 8-K filed January 30, 2019*
10.9	Amended and Restated Olin Corporation 2003 Long Term Incentive Plan codified as of January 27, 2019—Exhibit 10.2 to Olin's Form 8-K filed January 30, 2019*
10.10	Amended and Restated Olin Corporation 2006 Long Term Incentive Plan codified as of January 27, 2019—Exhibit 10.3 to Olin's Form 8-K filed January 30, 2019*
10.11	Amended and Restated Olin Corporation 2009 Long Term Incentive Plan codified as of January 27, 2019—Exhibit 10.4 to Olin's Form 8-K filed January 30, 2019*
10.12	Amended and Restated Olin Corporation 2014 Long Term Incentive Plan codified as of January 27, 2019—Exhibit 10.5 to Olin's Form 8-K filed January 30, 2019*
10.13	Amended and Restated Olin Corporation 2016 Long Term Incentive Plan codified as of January 27, 2019—Exhibit 10.6 to Olin's Form 8-K filed January 30, 2019*

10.14	Amended and Restated Olin Corporation 2018 Long Term Incentive Plan codified as of January 27, 2019—Exhibit 10.7 to Olin's Form 8-K filed January 30, 2019*
10.15	Olin Corporation Short Term Incentive Program dated December 10, 2020—Exhibit 10.1 to Olin's Form 8-K filed December 14, 2020*
10.16	Performance Share Program as amended through April 22, 2020—Exhibit 10.1 to Olin's Form 10-Q filed August 7, 2020*
10.17	Cooperation Agreement between Olin Corporation and Sachem Head Capital Management LP dated February 29, 2020—Exhibit 10.1 to Olin's Form 8-K filed March 2, 2020*
10.18	Amendment dated October 1, 2020 to Cooperation Agreement between Olin Corporation and Sachem Head Capital Management LP dated February 29, 2020—Exhibit 10.1 to Olin's Form 8-K filed October 2, 2020*
10.19	Offer Letter dated July 14, 2020 by and between Scott M. Sutton and Olin Corporation—Exhibit 10.1 to Olin's Form 8-K filed July 15, 2020*
10.20	Form of Non-Qualified Stock Option Award Certificate—Exhibit 10(r) to Olin's Form 10-K filed February 25, 2020*
10.21	Form of Restricted Stock Unit Award Certificate—Exhibit 10(s) to Olin's Form 10-K filed February 25, 2020*
10.22	Form of Performance Award Certificate—Exhibit 10(t) to Olin's Form 10-K filed February 25, 2020*
10.23	Form of Restricted Stock Unit and Performance Restricted Stock Unit Award Certificate and Description for Mr. Flaugher granted under Olin 2018 Long Term Incentive Plan
10.24	Summary of Stock Option/Performance Share Continuation Provisions for Olin Employees as amended effective August 20, 2019—Exhibit 10.1 to Olin's Form 8-K filed August 22, 2019*
10.25	Olin Corporation Contributing Employee Ownership Plan Amended and Restated effective as of October 24, 2008, and as amended effective September 29, 2015—Exhibit 99.1 to Olin's Form S-8 filed February 16, 2016*
10.26	Master Confirmation - Accelerated Share Repurchase dated August 5, 2019 between Olin Corporation and Goldman Sachs & Co LLC—Exhibit 10.1 to Olin's Form 8-K filed August 5, 2019*
10.27	Distribution Agreement between Olin Corporation and Arch Chemicals, Inc., dated as of February 1, 1999—Exhibit 2.1 to Olin's Form 8-K filed February 23, 1999*
10.28	Purchase Agreement dated as of February 28, 2011, by and among PolyOne Corporation, 1997 Chloralkali Venture, LLC, Olin Corporation and Olin SunBelt II, Inc. —Exhibit 2.1 to Olin's Form 8-K filed March 3, 2011*
10.29	Note Purchase Agreement dated December 22, 1997 between the SunBelt Chlor Alkali Partnership and the Purchasers named therein—Exhibit 99.5 to Olin's Form 8-K filed December 3, 2001*
10.30	Guarantee Agreement dated December 22, 1997 between Olin Corporation and the Purchasers named therein—Exhibit 99.6 to Olin's Form 8-K filed December 3, 2001*
10.31	Subordination Agreement dated December 22, 1997 between Olin Corporation and the Subordinated Parties named therein—Exhibit 99.7 to Olin's Form 8-K filed December 3, 2001*
10.32	Stock Purchase Agreement dated as of July 17, 2012, by and among K. A. Steel Chemicals Inc., the stockholders of K. A. Steel Chemicals Inc. and Robert F. Steel, as the sellers' representative, and Olin Corporation, as Purchaser—Exhibit 2.1 to Olin's Form 8-K filed July 18, 2012*
10.33	Credit Agreement dated June 23, 2015 among Olin Corporation, Olin Canada ULC, the Lenders named therein and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.1 to Olin's Form 8-K filed June 29, 2015*
10.34	Credit Agreement dated June 23, 2015 among Blue Cube Spinco Inc., the Lenders as named therein and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.2 to Olin's Form 8-K filed June 29, 2015*
10.35	Amendment Agreement dated June 23, 2015 among Olin, Olin Canada ULC, Blue Cube Spinco Inc., the Lenders as named therein, and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.5 to Olin's Form 8-K filed October 5, 2015*
10.36	Second Amendment Agreement, dated as of March 9, 2017 among Olin Corporation, Olin Canada ULC and Blue Cube Spinco Inc., the Lenders named therein and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.1 to Olin's Form 8-K filed March 9, 2017*
10.37	Third Amendment Agreement, dated as of June 28, 2018, among Olin Corporation, Olin Canada ULC and Blue Cube Spinco LLC, the Lenders named therein and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.2 to Olin's Form 10-Q filed August 1, 2018*
10.38	Separation Agreement dated March 26, 2015 between The Dow Chemical Company and Blue Cube Spinco Inc.—Exhibit 10.1 to Olin's Form 8-K filed March 27, 2015*
10.39	Credit Agreement dated August 25, 2015 among Olin Corporation, Olin subsidiaries, the Lenders as named therein and Sumitomo Mitsui Banking Corporation, as administrative agent—Exhibit 10.1 to Olin's Form 8-K filed August 25, 2015*
10.40	Amended and Restated Credit Agreement, dated as of October 5, 2015 as Amended and Restated by the Second Amendment Agreement dated as of March 9, 2017 among Olin Corporation, Olin Canada ULC and Blue Cube Spinco Inc., the Lenders named therein and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.2 to Olin's Form 8-K filed March 9, 2017*

10.41	Credit Agreement dated July 16, 2019 among Olin Corporation, Blue Cube Spinco, LLC, the Lenders and Issuing Banks as named therein and Wells Fargo Bank, National Association—Exhibit 10.1 to Olin's Form 8-K filed July 16, 2019*
10.42	First Amendment dated December 20, 2019 to Credit Agreement dated July 16, 2019 among Olin Corporation, Blue Cube Spinco, LLC, the Lenders and Issuing Banks as named therein and Wells Fargo Bank, National Association—Exhibit 10.1 to Olin's Form 8-K filed December 20, 2019*
10.43	Second Amendment dated May 8, 2020 to Credit Agreement dated July 16, 2019 among Olin Corporation, Blue Cube Spinco, LLC, the Lenders and Issuing Banks as named therein and Wells Fargo Bank, National Association—Exhibit 10.1 to Olin's Form 8-K filed May 11, 2020*
10.44	Guaranty Agreement dated October 5, 2015 among Blue Cube Spinco Inc., Olin Corporation and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.2 to Olin's Form 8-K filed October 5, 2015*
10.45	Borrowing Subsidiary Agreement dated October 5, 2015 among Olin Corporation, Blue Cube Spinco Inc. and Wells Fargo Bank, National Association, as administrative agent—Exhibit 10.3 to Olin's Form 8-K filed October 5, 2015*
10.46	Guaranty Joinder dated October 5, 2015 among Olin subsidiaries, Blue Cube Spinco Inc. and Sumitomo Mitsui Banking Corporation, as administrative agent—Exhibit 10.4 to Olin's Form 8-K filed October 5, 2015*
10.47	Incremental Term Loan Agreement dated November 3, 2015 among Olin Corporation, Blue Cube Spinco Inc., the Lenders as named therein and Sumitomo Mitsui Banking Corporation, as administrative agent—Exhibit 10.1 to Olin's Form 8-K filed November 9, 2015*
11	Computation of Per Share Earnings (included in Note 5 "Earnings Per Share" to Notes to Consolidated Financial Statements in Item 8)
21	Subsidiaries of Olin Corporation
22	List of Guarantors and Subsidiary Issuers of Guaranteed Securities—Exhibit 22 to Olin's Form 10-Q filed November 5, 2020*
23	Consent of KPMG LLP
31.1	Section 302 Certification Statement of Chief Executive Officer
31.2	Section 302 Certification Statement of Chief Financial Officer
32	Section 906 Certification Statement of Chief Executive Officer and Chief Financial Officer
101.INS	XBRL Instance Document**
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (embedded in the Exhibit 101 Interactive Data Files)

*Previously filed as indicated and incorporated herein by reference. Exhibits incorporated by reference are located in SEC file No. 1-1070 unless otherwise indicated.

**The instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline eXtensible Business Reporting Language (iXBRL) document. The consolidated financial statements and notes thereto contained in Part II, Item 8 were formatted in iXBRL in this Annual Report on Form 10-K.

Any exhibit is available from Olin by writing to the Secretary, Olin Corporation, 190 Carondelet Plaza, Suite 1530, Clayton, MO 63105 USA.

Shareholders may obtain information from EQ Shareowner Services, our registrar and transfer agent, who also manages our Automatic Dividend Reinvestment Plan by writing to: EQ Shareowner Services, 1110 Centre Pointe Curve, Suite 101, Mendota Heights, MN 55120 USA, by telephone from the United States at 800-401-1957 or outside the United States at 651-450-4064 or via the Internet under "Contact Us" at www.shareowneronline.com.

Item 16. FORM 10-K SUMMARY

None.

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.

OLIN CORPORATION
By: /s/ Scott Sutton
Scott Sutton
President and Chief Executive Officer

Date: February 22, 2021

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

Signature	***Title***	***Date***
/s/ SCOTT SUTTON Scott Sutton	President and Chief Executive Officer (Principal Executive Officer) and Director	February 22, 2021
/s/ JOHN E. FISCHER John E. Fischer	Executive Chairman and Director	February 22, 2021
/s/ HEIDI S. ALDERMAN Heidi S. Alderman	Director	February 22, 2021
/s/ BEVERLEY A. BABCOCK Beverley A. Babcock	Director	February 22, 2021
/s/ GRAY G. BENOIST Gray G. Benoist	Director	February 22, 2021
/s/ C. ROBERT BUNCH C. Robert Bunch	Director	February 22, 2021
/s/ SCOTT D. FERGUSON Scott D. Ferguson	Director	February 22, 2021
/s/ W. BARNES HAUPTFUHRER W. Barnes Hauptfuhrer	Director	February 22, 2021
/s/ JOHN M. B. O'CONNOR John M. B. O'Connor	Director	February 22, 2021
/s/ EARL L. SHIPP Earl L. Shipp	Director	February 22, 2021
/s/ VINCENT J. SMITH Vincent J. Smith	Director	February 22, 2021
/s/ WILLIAM H. WEIDEMAN William H. Weideman	Director	February 22, 2021
/s/ CAROL A. WILLIAMS Carol A. Williams	Director	February 22, 2021
/s/ TODD A. SLATER Todd A. Slater	Vice President and Chief Financial Officer (Principal Financial Officer)	February 22, 2021
/s/ RANDEE N. SUMNER Randee N. Sumner	Vice President and Controller (Principal Accounting Officer)	February 22, 2021

Exhibit 4.1

OLIN CORPORATION
DESCRIPTION OF SECURITIES

DESCRIPTION OF CAPITAL STOCK

The following statements with respect to our capital stock are subject to the detailed provisions of our Amended and Restated Articles of Incorporation, as further amended or restated, which we refer to as the Articles of Incorporation, our bylaws, as amended, which we refer to as the bylaws, and the provisions of applicable Virginia law, the state in which we are incorporated. These statements do not purport to be complete, or to give full effect to the terms of the provisions of statutory or common law, and are subject to, and are qualified in their entirety by reference to, the terms of the Articles of Incorporation and the bylaws, each of which has been filed as an exhibit to (or incorporated by reference in) our Annual Report on Form 10-K ("Form 10-K") filed with the Securities and Exchange Commission and the provisions of applicable Virginia law.

General

Our authorized stock consists of 240,000,000 shares of common stock, $1.00 par value per share, and 10,000,000 shares of preferred stock, $1.00 par value per share, issuable in one or more series. The number of shares of common stock outstanding is set forth in our audited financial statements included in our Form 10-K and Form 10-Q filings. No shares of preferred stock are outstanding.

Preferred Stock

The following description of the terms of the preferred stock sets forth certain general terms and provisions of the preferred stock. Specific terms of any series of the preferred stock will be set forth in an amendment to the Articles of Incorporation approved by our board of directors before any such shares are issued.

General. Under the Articles of Incorporation, our board of directors is authorized, without further shareholder action, to provide for the issuance of up to 10,000,000 shares of preferred stock in one or more series, with such voting powers and with such designations, preferences and relative, participating, optional or other special rights, and qualifications, limitations or restrictions, as shall be set forth in articles of an amendment to the Articles of Incorporation providing for the issuance thereof adopted by our board of directors or a duly authorized committee thereof.

The preferred stock will have the dividend, liquidation, redemption, conversion and voting rights set forth below unless otherwise provided in an amendment to the Articles of Incorporation. An amendment to the Articles of Incorporation may establish specific terms for the series of the preferred stock, including:

- the title and liquidation preference per share of such preferred stock and the number of shares offered;
- the price at which such preferred stock will be issued;
- the dividend rate, or method of calculation of dividends, the dates on which dividends shall be payable, whether such dividends shall be cumulative or noncumulative and, if cumulative, the dates from which dividends shall commence to accumulate;
- any redemption or sinking fund provisions of such preferred stock;
- any conversion provisions of such preferred stock; and
- any additional dividend, liquidation, redemption, sinking fund and other rights, preferences, privileges, limitations and restrictions of such preferred stock.

The preferred stock will, when issued, be fully paid and nonassessable. Unless otherwise specified, each series of the preferred stock will rank on a parity as to dividends and distributions in the event of a liquidation with our outstanding preferred stock and each other series of the preferred stock.

Dividend Rights. Holders of the preferred stock of each series will be entitled to receive, when, as and if declared by our board of directors, out of our assets legally available therefor, cash dividends at such rates and on such dates as are established for such series of the preferred stock. Such rate, which may be based upon one or more methods of determination, may be fixed or variable or both. Different series of the preferred stock may be entitled to dividends at different dividend rates or based upon different methods of determination. Each such dividend will be payable to the holders of record as they appear on our stock books on such record dates as will be fixed by our board of directors or a duly authorized committee thereof. Dividends on any series of the preferred stock may be cumulative or noncumulative. If our board of directors fails to declare a dividend payable on a dividend payment date on any series of preferred stock for which dividends are noncumulative, then the right to receive a dividend in respect of the dividend period ending on such dividend payment day will be lost, and we shall have no obligation to pay the dividend accrued for that period, whether or not dividends are declared for any future period.

If the terms of preferred stock issued so provide, when dividends are not paid in full upon any series of the preferred stock and any other preferred stock ranking on a parity as to dividends with such series of the preferred stock, all dividends declared upon such series of the preferred stock and any other preferred stock ranking on a parity as to dividends will be declared pro rata so that the amount of dividends declared per share on such series of the preferred stock and such other preferred stock will in all cases bear to each other the same ratio that accrued dividends per share on such series of the preferred stock and such other preferred stock bear to each other. Except as provided in the preceding sentence, unless full dividends, including, in the case of cumulative preferred stock, accumulations, if any, in respect of prior dividend payment periods, on all outstanding shares of any series of the preferred stock have been paid, no dividends, other than in shares of common stock or another stock ranking junior to such series of the preferred stock as to dividends and upon liquidation, will be declared or paid or set aside for payment or other distributions made upon our common stock or any of our other stock ranking junior to the preferred stock as to dividends. If the terms of preferred stock issued so provides, no common stock or any of our other stock ranking junior to or on a parity with such series of the preferred stock as to dividends or upon liquidation may be redeemed, purchased or otherwise acquired for any consideration, or any moneys paid to or made available for a sinking fund for the redemption of any shares of any such stock, by us, except by conversion into or exchange for our stock ranking junior to such series of the preferred stock as to dividends and upon liquidation.

The amount of dividends payable for each dividend period will be computed by annualizing the applicable dividend rate and dividing by the number of dividend periods in a year, except that the amount of dividends payable for the initial dividend period or any period shorter than a full dividend period shall be computed on the basis of 30-day months, a 360-day year and the actual number of days elapsed in the period.

Rights Upon Liquidation. In the event of any voluntary or involuntary liquidation, dissolution or winding up of our business, the holders of each series of preferred stock will be entitled to receive out of our assets available for distribution to shareholders, before any distribution of assets is made to holders of common stock or any other class of stock ranking junior to such series of preferred stock upon liquidation, liquidating distributions in the amount set forth in an amendment to the Articles of Incorporation. If, upon any voluntary or involuntary liquidation, dissolution or winding up of our business, the amounts payable with respect to the preferred stock of any series and any other shares of our stock ranking as to any such distribution on a parity with such series of the preferred stock are not paid in full, the holders of the preferred stock of such series and of such other shares will share ratably in any such distribution of our assets in proportion to the full respective preferential amounts to which they are entitled.

Redemption. A series of the preferred stock may be redeemable, in whole or in part, at our option, and may be subject to mandatory redemption pursuant to a sinking fund or otherwise, in each case upon terms, at the times and the redemption prices and for the types of consideration set forth in an amendment to the Articles of Incorporation.

An amendment to the Articles of Incorporation shall specify the number of shares of such series of preferred stock which shall be redeemed by us in each year commencing after a date to be specified, at a redemption price per share to be specified, together with an amount equal to any accrued and unpaid dividends thereon to the date of redemption.

Conversion Rights. An amendment to the Articles of Incorporation will state the terms, if any, on which shares of that series are convertible into shares of common stock or another series of our preferred stock. The preferred stock will have no preemptive rights.

Voting Rights. Except as indicated below or in an amendment to the Articles of Incorporation, or except as expressly required by applicable law, a holder of the preferred stock will not be entitled to vote. Except as indicated in an amendment to the Articles of Incorporation, in the event we issue shares of any series of preferred stock, each such share will be entitled to one vote on matters on which holders of such series of the preferred stock are entitled to vote.

The affirmative vote of the holders of a majority of the outstanding shares of any series of preferred stock, unless our board of directors establishes a higher amount, voting as a separate class, will be required for any amendment of the Articles of Incorporation which changes any rights or preferences of such series of preferred stock.

In addition to the foregoing voting rights, the holders of the preferred stock will have the voting rights set forth under "—General" above with respect to amendments to the Articles of Incorporation which would increase the number of authorized shares of our preferred stock.

Transfer Agent and Registrar. The transfer agent, registrar and dividend disbursement agent for a series of preferred stock will be selected by us. The registrar for shares of preferred stock will send notices to shareholders of any meetings at which holders of the preferred stock have the right to elect members of our board of directors or to vote on any other matter.

Common Stock

Holders of common stock are entitled to dividends as declared by our board of directors from time to time after payment of, or provision for, full cumulative dividends on and any required redemptions of shares of preferred stock then outstanding. Holders of common stock are entitled to one vote per share on all matters submitted for action by the shareholders and may not cumulate votes for the election of directors. Holders of common stock have no preemptive or subscription rights and have no liability for further calls or assessments. In the event of the liquidation, dissolution or winding up of our business, holders of common stock are entitled to receive pro rata all our remaining assets available for distribution, after satisfaction of the prior preferential rights of the preferred stock and the satisfaction of all our debts and liabilities.

The transfer agent and registrar for our common stock is EQ Shareowner Services.

Our common stock is listed on The New York Stock Exchange under the trading symbol "OLN".

Certain Provisions of Virginia Law, our Articles of Incorporation and our Bylaws

Certain Provisions of Virginia Law

We are subject to the following provisions of Virginia law which may have the effect of discouraging unsolicited acquisition proposals or delaying or preventing a change in control of our board of directors:

Antitakeover Statutes

As permitted by Virginia law, we have opted out of Article 14.1 of the Virginia Stock Corporation Act (the "VSCA"), the Virginia anti-takeover statute regulating "control share acquisitions", which are transactions causing the voting power of any person acquiring beneficial ownership of shares of a Virginia public corporation to meet or exceed certain threshold percentages (20 percent, 33 1/3 percent or 50 percent) of the total votes entitled to be cast for the election of directors. Under that Virginia statute, shares acquired in a control share acquisition have no voting rights unless granted by a majority vote of all outstanding shares entitled to vote in the election of directors other than those held by the acquiring person or held by any officer or employee director of the corporation, unless at the time of any control share acquisition, the articles of incorporation or bylaws of the corporation provide that this statute does not apply to acquisitions of its shares. An acquiring person that owns five percent or more of the corporation's voting stock may require that a special meeting of the shareholders be held, within 50 days of the acquiring person's request, to consider the grant of voting rights to the shares acquired or to be acquired in the control share acquisition. If voting rights are not granted and the corporation's articles of incorporation or bylaws permit, the acquiring person's shares may be redeemed by the corporation, at the corporation's option, at a price per share equal to the acquiring person's cost. Unless otherwise provided in the corporation's articles of incorporation or bylaws, the VSCA grants appraisal rights to any shareholder who objects to a control share acquisition that is approved by a vote of disinterested shareholders and that gives the acquiring person control of a majority of the corporation's voting shares. This regulation was designed to deter certain takeovers of Virginia public corporations.

We are subject to Article 14 of the VSCA, a Virginia statute regulating "affiliated transactions". An affiliated transaction is generally defined as a merger, a share exchange, a material disposition of corporate assets not in the ordinary course of business, any dissolution of the corporation proposed by or on behalf of a holder of more than 10 percent of any class of the corporation's outstanding voting shares (a "10 percent holder") or any reclassification, including reverse stock splits, recapitalization or merger of the corporation with its subsidiaries, that increases the percentage of voting shares owned beneficially by a 10 percent holder by more than five percent. In general, these provisions prohibit a Virginia corporation from engaging in affiliated transactions with any 10 percent holder for a period of three years following the date that such person became a 10 percent holder unless (1) the board of directors of the corporation and the holders of two-thirds of the voting shares, other than the shares beneficially owned by the 10 percent holder, approve the affiliated transaction or (2) before the date the person became a 10 percent holder, the board of directors approved the transaction that resulted in the shareholder becoming a 10 percent holder.

After three years, any such transaction must be at a "fair price", as described in the VSCA, or must be approved by a majority of the disinterested directors or the holders of two-thirds of the voting shares, other than the shares beneficially owned by the 10 percent holder.

Shareholder Action by Written Consent

The VSCA provides that, unless provided otherwise in a Virginia corporation's articles of incorporation, any action that may be authorized or taken at a meeting of shareholders may be authorized or taken without a meeting only by unanimous written consent of the shareholders who would be entitled to vote on the action. Our Articles of Incorporation do not include a provision that permits shareholders to take action without a meeting other than by unanimous written consent.

Certain Provisions of our Articles of Incorporation and our Bylaws

We are subject to the following provisions of the Articles of Incorporation and bylaws, which may have the effect of discouraging unsolicited acquisition proposals or delaying or preventing a change in control of our board of directors:

Board of Directors. Our board of directors consists of three classes as nearly equal in number as possible, each of which serves for three years with one class being elected each year. The total number of directors may not exceed 18. Our board of directors currently consists of 13 directors, but the number of directors may be increased to any number, not more than 18 directors, or decreased to any number, not less than three directors, by amendment of the bylaws. Subject to the rights granted to holders of any preferred stock, directors may be removed only with cause, and vacancies on our board of directors, including any vacancy created by an increase in the number of directors, may be filled at an annual meeting by shareholders entitled to vote in the election of directors or by a majority of the directors remaining in office, even though less than a quorum. If our board of directors fills a vacancy, the director's term expires at the next shareholders' meeting at which directors are elected.

Shareholder Nominations and Proposals. Our bylaws require that advance notice of nominees for election as directors be made by a shareholder or shareholder proposals be given to our corporate secretary, together with certain specified information, no later than 90 days before the anniversary of the immediately preceding annual meeting of shareholders.

Special Meetings of Shareholders. Special meetings of our shareholders may be called only by our board of directors, chairman of our board of directors, president or the holders of a majority of the shares entitled to vote at the special meeting.

Amendments to the Articles of Incorporation

Under Virginia law, unless a Virginia corporation's articles of incorporation provide for a greater or lesser vote, amendments of the articles of incorporation must be approved by each voting group entitled to vote on the proposed amendment by more than two-thirds of all the votes entitled to be cast by that voting group. However, the vote specified in the articles of incorporation may not be reduced to less than a majority of all votes cast by the voting group at a meeting at which a quorum of the voting group exists.

Our Articles of Incorporation provide that any amendment to our Articles of Incorporation is required to be approved only by a majority of the votes entitled to be cast by each voting group that is entitled to vote on the matter, unless in submitting an amendment or restatement to the shareholders our board of directors shall require a greater vote.

Amendments to the Bylaws

Under Virginia law, a corporation's shareholders or board of directors may amend or repeal bylaws, except to the extent that the corporation's articles of incorporation or Virginia law reserve the power exclusively to the shareholders. A corporation's shareholders may amend or repeal bylaws even though the bylaws may also be amended or repealed by its board of directors.

Our bylaws may be altered, amended or repealed by our board of directors, subject to the power of the shareholders to alter or repeal the bylaws made by the board of directors at any annual or special meeting of the shareholders. Subject to certain limitations, shareholders in altering, amending or repealing our bylaws may provide that our board of directors may not subsequently alter, amend or repeal our bylaws.

Exhibit 4.46

AMENDMENT NO. 5 TO RECEIVABLES FINANCING AGREEMENT
AND
REAFFIRMATION OF PERFORMANCE GUARANTY

This AMENDMENT NO. 5 TO RECEIVABLES FINANCING AGREEMENT AND REAFFIRMATION OF PERFORMANCE GU (this "Amendment"), dated as of December 28, 2020, is entered into by and among OLIN FINANCE COMPANY, LLC ("Olin Finance"), as borrower under the Receivables Financing Agreement (as defined below) (in such capacity, together with its successors and permitted assigns in such capacity, the "Borrower"), OLIN CORPORATION ("Olin"), as initial servicer under the Receivables Financing Agreement (in such capacity, together with its successors and permitted assigns in such capacity, the "Servicer"), PNC BANK, NATIONAL ASSOCIATION ("PNC"), as administrative agent under the Receivables Financing Agreement (in such capacity, together with its successors and permitted assigns in such capacity, the "Administrative Agent"), as a committed lender under the Receivables Financing Agreement (in such capacity, together with its successors and permitted assigns in such capacity, a "Committed Lender"), and as group agent for the PNC Group under the Receivables Financing Agreement (in such capacity, together with its successors and permitted assigns in such capacity, a "Group Agent"), THE TORONTO-DOMINION BANK ("TD Bank"), as a related committed lender under the Receivables Financing Agreement (in such capacity, together with its successors and permitted assigns in such capacity, a "Related Committed Lender" and together with PNC as a Committed Lender, the "Committed Lenders") and as group agent for the TD Bank Group under the Receivables Financing Agreement (in such capacity, together with its successors and permitted assigns in such capacity, a "Group Agent" and together with PNC as Group Agent, the "Group Agents"), COMPUTERSHAR TRUST COMPANY OF CANADA, in its capacity as trustee of RELIANT TRUST, by its U.S. Financial Services Agent, THE TORONTO-DOMI BANK, as conduit lender under the Receivables Financing Agreement (in such capacity, together with its successors and permitted assigns in such capacity the "Conduit Lender" and collectively with the Committed Lenders, the "Lenders") and the various other Lenders and Group Agents from time to time party to the Receivables Financing Agreement, and acknowledged and agreed to by PNC CAPITAL MARKETS LLC, as structuring agent (in such capacity, together with its successors and permitted assigns in such capacity, the "Structuring Agent"), and is reaffirmed by, with respect to Section 11 hereof, Olin, as performance guarantor (in such capacity, together with its successors and permitted assigns in such capacity, the "Performance Guarantor").

BACKGROUND

WHEREAS, the Borrower, the Servicer, the Persons from time to time party thereto as Lenders and as Group Agents, the Administrative Agent, an solely with respect to Section 10.10 thereof, the Structuring Agent, entered into the Receivables Financing Agreement as of December 20, 2016 (as amended restated, supplemented or otherwise modified as of the date hereof, the "Original Receivables Financing Agreement"; as may be further amended, restated, supplemented or otherwise modified from time to time, the "Receivables Financing Agreement");

WHEREAS, the Performance Guarantor entered into the Performance Guaranty as of December 20, 2016 (as may be amended, restate supplemented or otherwise modified from time to time, the "Performance Guaranty") in favor of, and as accepted by, the Administrative Agent; and

WHEREAS, the parties hereto wish to further amend the Original Receivables Financing Agreement pursuant to the terms and conditions set fort herein.

NOW, THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt and sufficiency of which are hereb acknowledged, the parties hereto hereby agree as follows:

SECTION 1 Definitions. Capitalized terms used but not defined in this Amendment shall have the meanings assigned to them in the Receivables Financing Agreement.

SECTION 2 Amendments to Original Receivables Financing Agreement. Effective as of the date hereof and subject to the satisfaction of the conditions precedent set forth in Section 4 hereof, the Original Receivables Financing Agreement is hereby amended as follows:

(a) Clause (h) of the definition of "Eligible Receivable" set forth in Section 1.01 of the Original Receivables Financing Agreement is hereby delete and replaced in its entirety with the following:

> (h) with respect to which all consents, licenses, approvals or authorizations of, or registrations or declarations with or notices to, any Governmental Authority or other Person required to be obtained, effected or given by an Originator in connection with the creation of such Receivable, the execution, delivery and performance by such Originator of the related Contract or the sale and assignment thereof under the Purchase and Sale Agreement have been duly obtained, effected or given and are in full force and effect, other than any filings under the Federal Assignment of Claims Act (or any other similar Applicable Law, including any state or municipal law or regulation);

(b) Clause (b) of the definition of "Excess Concentration" set forth in Section 1.01 of the Original Receivables Financing Agreement is hereby deleted and replaced in its entirety with the following:

> (b) the excess (if any) of (i) the aggregate Outstanding Balance of all Eligible Receivables, the Obligors of which are Governmenta Authorities, net of any other Excess Concentration amounts, over (ii) the product of (x) if a Ratings Event has occurred and is continuing and the Majority Group Agents have notified the Borrower in writing, seven and one half percent (7.5%), otherwise fifteen percent (15.0%), multiplied by (y) the aggregate Outstanding Balance of all Eligible Receivables then in the Receivables Pool; plus

(c) Section 4.06 of the Original Receivables Financing Agreement is hereby amended by deleting such section in its entirety and replacing it with the following:

SECTION 4.06. Benchmark Replacement Setting.

(a) Benchmark Replacement. Notwithstanding anything to the contrary herein or in any other Transaction Document, if a Benchmark Transition Event or an Early Opt-in Election, as applicable, and its related Benchmark Replacement Date have occurred prior to the Reference Time in respect of any setting of the then-current Benchmark, then (x) if a Benchmark Replacement is determined in accordance with clause (1) or (2) of the definition of "Benchmark Replacement" for such Benchmark Replacement Date, such Benchmark Replacement will replace such Benchmark for all purposes hereunder and under any Transaction Document in respect of such Benchmark setting and subsequent Benchmark settings without any amendment to, or further action or consent of any other party to, this Agreement or any other Transaction Document and (y) if a Benchmark Replacement is determined in accordance with clause (3) of the definition of "Benchmark Replacement" for such Benchmark Replacement Date, such Benchmark Replacement will replace such Benchmark for all purposes hereunder and under any Transaction Document in respect of any Benchmark setting at or after 5:00 p.m. (New York City time) on the fifth (5th) Business Day after the date notice of such Benchmark Replacement is provided to the Lenders without any amendment to, or further action or consent of any other party to, this Agreement or any other Transaction Document so long as the Administrative Agent has not received, by such time, written notice of objection to such Benchmark Replacement from the Majority Group Agents.

(b) Benchmark Replacement Conforming Changes. In connection with the implementation of a Benchmark Replacement, the Administrative Agent will have the right to make Benchmark Replacement Conforming Changes from time to time and, notwithstanding anything to the contrary herein or in any other Transaction Document, any amendments implementing such Benchmark Replacement Conforming Changes will become effective without any further action or consent of any other party to this Agreement or any other Transaction Document.

(c) Notices; Standards for Decisions and Determinations. The Administrative Agent will promptly notify the Borrower and the Lenders of (i) any occurrence of a Benchmark Transition Event, a Term SOFR Transition Event or an Early Opt-in Election, as applicable, and its related Benchmark Replacement Date, (ii) the implementation of any Benchmark Replacement, (iii) the effectiveness of any Benchmark Replacement Conforming Changes, (iv) the removal or reinstatement of any tenor of a Benchmark pursuant to Section 4.06(d) below and (v) the commencement or conclusion of any Benchmark Unavailability Period. Any determination, decision or election that may be made by the Administrative Agent or the Majority Group Agents pursuant to this Section 4.06, including any determination with respect to a tenor, rate or adjustment or of the occurrence or non-occurrence of an event, circumstance or date and any decision to take or refrain from taking any action or any selection, will be conclusive and binding absent manifest error and may be made in its or their sole discretion and without consent from any other party to this Agreement or any other Transaction Document, except, in each case, as expressly required pursuant to this Section 4.06.

(d) Unavailability of Tenor of Benchmark. Notwithstanding anything to the contrary herein or in any other Transaction Document, at any time (including in connection with the implementation of a Benchmark Replacement), (i) if the then-current Benchmark is a term rate (includin Term SOFR or USD LIBOR) and either (A) any tenor for such Benchmark is not displayed on a screen or other information service that publish such rate from time to time as selected by the Administrative Agent in its reasonable discretion or (B) the regulatory supervisor for the administrator o such Benchmark has provided a public statement or publication of information announcing that any tenor for such Benchmark is or will be no longe representative, then the Administrative Agent may modify the definition of "Interest Period" for any Benchmark settings at or after such time to remove such unavailable or non-representative tenor and (ii) if a tenor that was removed pursuant to clause (i) above either (A) is subsequently displayed on a screen or information service for a Benchmark (including a Benchmark Replacement) or (B) is not, or is no longer, subject to an announcement that i is or will no longer be representative for a Benchmark (including a Benchmark Replacement), then the Administrative Agent may modify the definitio of "Interest Period" for all Benchmark settings at or after such time to reinstate such previously removed tenor.

(e) Benchmark Unavailability Period. Upon the Borrower's receipt of notice of the commencement of a Benchmark Unavailabilit Period, the Borrower may revoke any request for a Loan bearing interest based on USD LIBOR, conversion to or continuation of Loans beari interest based on USD LIBOR to be made, converted or continued during any Benchmark Unavailability Period and, failing that, the Borrower will b deemed to have converted any such request into a request for a Loan of or conversion to Loans bearing interest under the Base Rate Option.During any Benchmark Unavailability Period or at any time that a tenor for the then-current Benchmark is not an Available Tenor, the component of the Base Rate based upon the then-current Benchmark or such tenor for such Benchmark, as applicable, will not be used in any determination of the Base Rate.

(f) Secondary Term SOFR Conversion. Notwithstanding anything to the contrary herein or in any other Transaction Document and subject to the proviso below in this Section 4.06(f), if a Term SOFR Transition Event and its related Benchmark Replacement Date have occurre prior to the Reference Time in respect of any setting of the then-current Benchmark, then (i) the applicable Benchmark Replacement will replace the then-current Benchmark for all purposes hereunder or under any Transaction Document in respect of such Benchmark setting (the "Secondary Term SOFR Conversion Date") and subsequent Benchmark settings, without any amendment to, or further action or consent of any other party to, this Agreement or any other Transaction Document; and (ii) Loans outstanding on the Secondary Term SOFR Conversion Date bearing interest based o the then-current Benchmark shall be deemed to have been converted to Loans bearing interest at the Benchmark Replacement with a teno approximately the same length as the interest payment period of the then-current Benchmark; provided that, this Section 4.06(f) shall not be effective unless the Administrative Agent has delivered to the Lenders and the Borrower a Term SOFR Notice.

(g) Certain Defined Terms. As used in this Section 4.06:

"Available Tenor" means, as of any date of determination and with respect to the then-current Benchmark, as applicable, (x) if the then current Benchmark is a term rate or is based on a term rate, any tenor for such Benchmark that is or may be used for determining the length of an Interest Period pursuant to this Agreement as of such date and not including, for the avoidance of doubt, any tenor for such Benchmark that is then-removed from the definition of "Interest Period" pursuant to Section 4.06(d), or (y) if the then current Benchmark is not a term rate nor based on a term rate, any payment period for interest calculated with reference to such Benchmark pursuant to this Agreement as of such date.

"Benchmark" means, initially, USD LIBOR; provided that if a Benchmark Transition Event, a Term SOFR Transition Event or an Early Opt-in Election, as applicable, and its related Benchmark Replacement Date have occurred with respect to USD LIBOR or the then-curre Benchmark, then "Benchmark" means the applicable Benchmark Replacement to the extent that such Benchmark Replacement has replaced such prior benchmark rate pursuant to Section 4.06(a).

"Benchmark Replacement" means, for any Available Tenor, the first alternative set forth in the order below that can be determined by the Administrative Agent for the applicable Benchmark Replacement Date:

(1) the sum of: (a) Term SOFR and (b) the related Benchmark Replacement Adjustment;

(2) the sum of: (a) Daily Simple SOFR and (b) the related Benchmark Replacement Adjustment; and

(3) the sum of: (a) the alternate benchmark rate that has been selected by the Administrative Agent and the Borrower as the replacement for the then-current Benchmark for the applicable Corresponding Tenor giving due consideration to (i) any selection or recommendation of a replacement benchmark rate or the mechanism for determining such a rate by the Relevant Governmental Body or (ii) any evolving or then-prevailing market convention for determining a benchmark rate as a replacement for the then-current Benchmark for U.S. dollar-denominated syndicated credit facilities at such time and (b) the related Benchmark Replacement Adjustment;

provided that, in the case of clause (1), such Unadjusted Benchmark Replacement is displayed on a screen or other information service that publishes such rate from time to time as selected by the Administrative Agent in its reasonable discretion; provided, further, that, with respect to a Term SOFR Transition Event, on the applicable Benchmark Replacement Date, the Benchmark Replacement" shall revert to and shall be determined as set forth in clause (1) of this definition. If the Benchmark Replacement as determined pursuant to clause (1), (2) or (3) above would be less than the Floor, the Benchmark Replacement will be deemed to be the Floor for the purposes of this Agreement and the other Transaction Documents.

"Benchmark Replacement Adjustment" means, with respect to any replacement of the then-current Benchmark with an Unadjusted Benchmark Replacement for any applicable Available Tenor for any setting of such Unadjusted Benchmark Replacement:

(1) for purposes of clauses (1) and (2) of the definition of "Benchmark Replacement," the first alternative set forth in the order below that can be determined by the Administrative Agent:

(a) the spread adjustment, or method for calculating or determining such spread adjustment, (which may be a positive or negative value or zero) as of the Reference Time such Benchmark Replacement is first set for such Available Tenor that has been selected or recommended by the Relevant Governmental Body for the replacement of such Benchmark with the applicable Unadjusted Benchmark Replacement for the applicable Corresponding Tenor;

(b) the spread adjustment (which may be a positive or negative value or zero) as of the Reference Time such Benchmark Replacement is first set for such Available Tenor that would apply to the fallback rate for a derivative transaction referencing the ISDA Definitions to be effective upon an index cessation event with respect to such Benchmark for the applicable Corresponding Tenor; and

(2) for purposes of clause (3) of the definition of "Benchmark Replacement," the spread adjustment, or method for calculating or determining such spread adjustment, (which may be a positive or negative value or zero) that has been selected by the Administrative Agent and the Borrower for the applicable Corresponding Tenor giving due consideration to (i) any selection or recommendation of a spread adjustment, or method for calculating or determining such spread adjustment, for the replacement of such Benchmark with the applicable Unadjusted Benchmark Replacement by the Relevant Governmental Body on the applicable Benchmark Replacement Date or (ii) any evolving or then-prevailing market convention for determining a spread adjustment, or method for calculating or determining such spread adjustment, for the replacement of such Benchmark with the applicable Unadjusted Benchmark Replacement for U.S. dollar-denominated syndicated credit facilities;

provided that, (x) in the case of clause (1) above, such adjustment is displayed on a screen or other information service that publishes such Benchmark Replacement Adjustment from time to time as selected by the Administrative Agent in its reasonable discretion and (y) if the then-current Benchmark is a term rate, more than one tenor of such Benchmark is available as of the applicable Benchmark Replacement Date and the applicable Unadjusted Benchmark Replacement will not be a term rate, the Available Tenor of such Benchmark for purposes of this definition of "Benchmark Replacement Adjustment" shall be deemed to be the Available Tenor that has approximately the same length (disregarding business day adjustments) as the payment period for interest calculated with reference to such Unadjusted Benchmark Replacement.

"Benchmark Replacement Conforming Changes" means, with respect to any Benchmark Replacement, any technical, administrative or operational changes (including changes to the definition of "Base Rate," the definition of "Business Day," the definition of "Interest Period," timing and frequency of determining rates and making payments of interest, timing of borrowing requests or prepayment, conversion or continuation notices, length of lookback periods, the applicability of breakage provisions, and other technical, administrative or operational matters) that the Administrative Agent reasonably decides may be appropriate to reflect the adoption and implementation of such Benchmark Replacement and to permit the administration thereof by the Administrative Agent in a manner substantially consistent with market practice (or, if the Administrative Agent decides that adoption of any portion of such market practice is not administratively feasible or if the Administrative Agent determines that no market practice for the administration of such Benchmark Replacement exists, in such other manner of administration as the Administrative Agent reasonably decides is reasonably necessary in connection with the administration of this Agreement and the other Transaction Documents).

"Benchmark Replacement Date" means the earliest to occur of the following events with respect to the then-current Benchmark:

(1) in the case of clause (1) or (2) of the definition of "Benchmark Transition Event," the later of (a) the date of the public statement or publication of information referenced therein and (b) the date on which the administrator of such Benchmark (or the published component used in the calculation thereof) permanently or indefinitely ceases to provide all Available Tenors of such Benchmark (or such component thereof);

(2) in the case of clause (3) of the definition of "Benchmark Transition Event," the date determined by the Administrative Agent, which date shall promptly follow the date of the public statement or publication of information referenced therein;

(3) in the case of a Term SOFR Transition Event, the date that is set forth in the Term SOFR Notice provided to the Lenders and the Borrower

pursuant to this Section 4.06, which date shall be at least thirty (30) days from the date of the Term SOFR Notice; or

(4) in the case of an Early Opt-in Election, the sixth (6th) Business Day after the date notice of such Early Opt-in Election is provided to the Group Agents, so long as the Administrative Agent has not received, by 5:00 p.m. (New York City time) on the fifth (5th) Business Day after the date notice of such Early Opt-in Election is provided to the Lenders, written notice of objection to such Earl Opt-in Election from the Majority Group Agents.

For the avoidance of doubt, (i) if the event giving rise to the Benchmark Replacement Date occurs on the same day as, but earlier than, the Reference Time in respect of any determination, the Benchmark Replacement Date will be deemed to have occurred prior to the Reference Time for such determination and (ii) the "Benchmark Replacement Date" will be deemed to have occurred in the case of clause (1) or (2) with respect to any Benchmark upon the occurrence of the applicable event or events set forth therein with respect to all then-current Available Tenors of such Benchmark (or the published component used in the calculation thereof).

"Benchmark Transition Event" means the occurrence of one or more of the following events with respect to the then-current Benchmark:

(1) a public statement or publication of information by or on behalf of the administrator of such Benchmark (or the published component used in the calculation thereof) announcing that such administrator has ceased or will cease to provide all Available Tenors of such Benchmark (or such component thereof), permanently or indefinitely, provided that, at the time of such statement or publication, there is no successor administrator that will continue to provide any Available Tenor of such Benchmark (or such component thereof);

(2) a public statement or publication of information by a Governmental Authority having jurisdiction over the Administrative Agent, the regulatory supervisor for the administrator of such Benchmark (or the published component used in the calculation thereof), the Federal Reserve Board, the Federal Reserve Bank of New York, an insolvency official with jurisdiction over the administrator for such Benchmark (or such component), a resolution authority with jurisdiction over the administrator for such Benchmark (or such component) or a court or an entity with similar insolvency or resolution authority over the administrator for such Benchmark (or such component), which states that the administrator of such Benchmark (or such component) has ceased or will cease to provide all Available Tenors of such Benchmark (or such component thereof) permanently or indefinitely, provided that, at the time of such statement or publication, there is no successor administrator that

will continue to provide any Available Tenor of such Benchmark (or such component thereof); or

(3) a public statement or publication of information by the regulatory supervisor for the administrator of such Benchmark (or the published component used in the calculation thereof) or a Governmental Authority having jurisdiction over the Administrative Agent announcing that all Available Tenors of such Benchmark (or such component thereof) are no longer representative.

For the avoidance of doubt, a "Benchmark Transition Event" will be deemed to have occurred with respect to any Benchmark if a public statement or publication of information set forth above has occurred with respect to each then-current Available Tenor of such Benchmark (or the published component used in the calculation thereof).

"Benchmark Unavailability Period" means the period (if any) (x) beginning at the time that a Benchmark Replacement Date pursuant to clauses (1) or (2) of that definition has occurred if, at such time, no Benchmark Replacement has replaced the then-current Benchmark for all purposes hereunder and under any Transaction Document in accordance with this Section 4.06 and (y) ending at the time that a Benchmark Replacement has replaced the then-current Benchmark for all purposes hereunder and under any other Transaction Document in accordance with this Section 4.06.

"Corresponding Tenor" with respect to any Available Tenor means, as applicable, either a tenor (including overnight) or an interest payment period having approximately the same length (disregarding business day adjustment) as such Available Tenor.

"Daily Simple SOFR" means, for any day, SOFR, with the conventions for this rate (which will include a lookback) being established by the Administrative Agent in accordance with the conventions for this rate selected or recommended by the Relevant Governmental Body for determining "Daily Simple SOFR" for business loans; provided, that if the Administrative Agent decides that any such convention is not administratively feasible for the Administrative Agent, then the Administrative Agent may establish another convention in its reasonable discretion.

"Early Opt-in Election" means, if the then-current Benchmark is USD LIBOR, the occurrence of:

(1) a notification by the Administrative Agent to (or the request by the Borrower to the Administrative Agent to notify) each of the other parties hereto that at least five currently outstanding U.S. dollar-denominated syndicated credit facilities at such time contain (as a result of amendment or as originally executed) a SOFR-based rate (including SOFR, a term

SOFR or any other rate based upon SOFR) as a benchmark rate (and such syndicated credit facilities are identified in such notice an are publicly available for review), and

(2) the joint election by the Administrative Agent and the Borrower to trigger a fallback from USD LIBOR and the provision by th Administrative Agent of written notice of such election to the Lenders.

"Floor" means the benchmark rate floor, if any, provided in this Agreement initially (as of the execution of this Agreement, the modification, amendment or renewal of this Agreement or otherwise) with respect to USD LIBOR or, if no floor is specified, zero.

"ISDA Definitions" means the 2006 ISDA Definitions published by the International Swaps and Derivatives Association, Inc. or an successor thereto, as amended or supplemented from time to time, or any successor definitional booklet for interest rate derivatives published from time to time by the International Swaps and Derivatives Association, Inc. or such successor thereto.

"Reference Time" with respect to any setting of the then-current Benchmark means (1) if such Benchmark is USD LIBOR, 11:00 a.n (London time) on the day that is two London banking days preceding the date of such setting, and (2) if such Benchmark is not USD LIBOI the time determined by the Administrative Agent in its reasonable discretion.

"Relevant Governmental Body" means the Federal Reserve Board or the Federal Reserve Bank of New York, or a committe officially endorsed or convened by the Federal Reserve Board or the Federal Reserve Bank of New York, or any successor thereto.

"SOFR" means, with respect to any Business Day, a rate per annum equal to the secured overnight financing rate for such Business Day published by the SOFR Administrator on the SOFR Administrator's Website on the immediately succeeding Business Day.

"SOFR Administrator" means the Federal Reserve Bank of New York (or a successor administrator of the secured overnight financing rate).

"SOFR Administrator's Website" means the website of the Federal Reserve Bank of New York, currently at http://www.newyorkfed.org, or any successor source for the secured overnight financing rate identified as such by the SOFR Administrator from time to time.

"Term SOFR" means, for the applicable Corresponding Tenor as of the applicable Reference Time, the forward-looking term rate based on SOFR that has been selected or recommended by the Relevant Governmental Body.

"Term SOFR Notice" means a notification by the Administrative Agent to the Lenders and the Borrower of the occurrence of a Term SOFR Transition Event.

"Term SOFR Transition Event" means the determination by the Administrative Agent that (a) Term SOFR has been recommended for use by the Relevant Governmental Body, and is determinable for each Available Tenor, (b) the administration of Term SOFR is administratively feasible for the Administrative Agent and (c) a Benchmark Transition Event has previously occurred resulting in a Benchmark Replacement in accordance with this Section 4.06 that is not Term SOFR.

"Unadjusted Benchmark Replacement" means the applicable Benchmark Replacement excluding the related Benchmark Replacement Adjustment.

"USD LIBOR" means any London interbank offered rate for U.S. dollars, including Adjusted LIBOR and LMIR, as applicable.

(d) Section 7.01(y) of the Original Receivables Financing Agreement is hereby amended by adding the following sentence at the end of such section:

On or prior to February 12, 2021, or such later date as may be specified in writing by the Administrative Agent, the Borrower shall (A) enter into and deliver to the Administrative Agent and the Group Agents an executed copy of the Amendment No. 1 to the Deposit Account Control Agreement, by and among the Borrower, the Servicer, the Administrative Agent and Bank of America, N.A., as the Collection Account Bank, subjecting the Collection Accounts ending in and specified on Schedule II hereto to an Account Control Agreement, in form and substance satisfactory to the Administrative Agent and the Group Agents and (B) deliver a favorable opinion addressed to the Administrative Agent and each Group Agent, in form and substance satisfactory to the Administrative Agent and such Group Agents, from Missouri counsel to Olin Russellville Cell Technologies LLC ("Olin Russellville") covering certain security interest matters as may be reasonably requested by the Administrative Agent and/or a Group Agent.

(e) Section 7.01(h) of the Original Receivables Financing Agreement is hereby amended by deleting such section in its entirety and replacing it with the following:

(h) Payments on Receivables, Collection Accounts The Borrower (or the Servicer on its behalf) will, and will cause each Originator to, at all times, instruct all Obligors to deliver payments on the Pool Receivables to a Collection Account or a Lock-Box.The Borrower (or the Servicer on its behalf) will, and will cause each Originator to, at all times, maintain such books and records as are necessary to identify Collections received from time to time on Pool Receivables and to segregate such Collections from other property of the Servicer and the Originators.If any payments on the Pool Receivables or other Collections are received by the Borrower, the Servicer or an Originator, it shall hold such payments in trust for the benefit of the Administrative Agent, the Group Agents and the other Secured Parties and promptly (but in any event within one (1) Business Day after receipt) remit such funds into a Collection Account. The Borrower (or the Servicer on its behalf) will cause each Collection Account Bank to comply with the terms of each applicable Account Control Agreement. The Borrower shall not instruct any Person other than the Obligors (and the Excluded Obligors to the extent permitted pursuant to the proviso below) to deposit funds other than Collections on Pool Receivables, other Collateral and remittances of funds for Excluded Receivables (subject to the proviso below) into any Collection Account. If such funds are nevertheless deposited into any Collection Account, the Borrower (or the Servicer on its behalf) will within two (2) Business Days, (x) identify and transfer such funds to the appropriate Person entitled to such funds and (y) shall instruct such Person to no longer deposit any such funds into any such Collection Account. Except as permitted by this Section, the Borrower will not, and will not permit the Servicer, any Originator or any other Person to commingle Collections or other funds to which the Administrative Agent, any Group Agent or any other Secured Party is entitled, with any other funds; provided, that, with respect to any Excluded Receivables, the Originator of which is Olin Russellville and the Obligor of which is The Dow Chemical Company or any Affiliate thereof (the "Olin Russellville-Dow Excluded Receivables"), which Excluded Receivables are originated on or before February 12, 2021, or such later date as may be consented to by the Majority Group Agents, such commingling shall be permitted solely with respect to remittance of funds for such Olin Russellville-Dow Excluded Receivables; provided, further, that with respect to any Olin Russellville-Dow Excluded Receivables, after February 12, 2021, or such later date as it may be consented to by the Majority Group Agents, the Borrower shall instruct the Servicer, such Originator or such Person to (x) transfer such funds related to the Olin Russellville-Dow Excluded Receivables into an account other than a Collection Account, (y) no longer deposit any such funds into any such Collection Account and (z) instruct the related Excluded Obligor to no longer deposit any such funds into any such Collection Account. The Borrower shall only add a Collection Account (or a related Lock-Box) or a Collection Account Bank to those listed on Schedule II to this Agreement, if the Administrative Agent has received notice of such addition and an executed and acknowledged copy of an Account Control Agreement (or an amendment thereto) in form and substance acceptable to the Administrative Agent from the applicable Collection Account Bank. The Borrower shall only terminate a Collection Account Bank or close a Collection Account (or a related Lock-Box) with the prior written consent of the Administrative Agent.

(f) Section 7.02(f) of the Original Receivables Financing Agreement is hereby amended by deleting such section in its entirety and replacing it with the following:

(f) Payments on Receivables, Collection Accounts The Servicer will at all times, instruct all Obligors to deliver payments on the Pool Receivables to a Collection Account or a Lock-Box. The Servicer will, at all times, maintain such books and records as are necessary to identify Collections received from time to time on Pool Receivables and to segregate such Collections from other property of the Servicer and the Originators. If any payments on the Pool Receivables or other Collections are received by the Borrower, the Servicer or an Originator, it shall hold such payments in trust for the benefit of the Administrative Agent, the Group Agents and the other Secured Parties and promptly (but in any event within one (1) Business Day after receipt) remit such funds into a Collection Account. The Servicer shall not instruct any Person other than the Obligors (and the Excluded Obligors to the extent permitted pursuant to the proviso below) to deposit funds other than Collections on Pool Receivables, other Collateral and remittances of funds for Excluded Receivables (subject to the proviso below) into any Collection Account. If such funds are nevertheless deposited into any Collection Account, the Servicer will within two (2) Business Days (x) identify and transfer such funds to the appropriate Person entitled to such funds and (y) shall instruct such Person to no longer deposit any such funds into any such Collection Account. Except as permitted by this Section, the Servicer will not, and will not permit the Borrower, any Originator or any other Person to commingle Collections or other funds to which the Administrative Agent, any Group Agent or any other Secured Party is entitled, with any other funds; provided, that, with respect to any Olin Russellville-Dow Excluded Receivables, which Excluded Receivables are originated on or before February 12, 2021, or such later date as may be consented to by the Majority Group Agents, such commingling shall be permitted solely with respect to remittance of funds for such Olin Russellville-Dow Excluded Receivables; provided, further, that with respect to any Olin Russellville-Dow Excluded Receivables, after February 21, 2021, the Servicer shall instruct the Borrower, such Originator or such Person to (x) transfer such funds related to the Olin Russellville-Dow Excluded Receivables into an account other than a Collection Account, (y) no longer deposit any such funds into any such Collection Account and (z) instruct the related Excluded Obligor to no longer deposit any such funds into any such Collection Account. The Servicer shall only add a Collection Account (or a related Lock-Box), or a Collection Account Bank, to those listed on Schedule II to this Agreement, if the Administrative Agent has received notice of such addition and an executed and acknowledged copy of an Account Control Agreement (or an amendment thereto) in form and substance acceptable to the Administrative Agent from the applicable Collection Account Bank. The Servicer shall only terminate a Collection Account Bank or close a Collection Account (or a related Lock-Box) with the prior written consent of the Administrative Agent.

(g) Schedule II to the Original Receivables Financing Agreement is hereby deleted and replaced in its entirety with the schedule set forth in Exhibit A attached hereto.

(h) Schedule III to the Original Receivables Financing Agreement is hereby deleted and replaced in its entirety with the schedule set forth in Exhibit B attached hereto.

SECTION 3 Representations, Warranties and Enforceability. Each of the Borrower and the Servicer hereby represents and warrants to the Administrative Agent, the Group Agents and the Lenders, as applicable, as of the date hereof with respect to itself, as follows:

(a) the representations and warranties of it contained in Section 6.01 and Section 6.02, as applicable, of the Receivables Financing Agreement are true and correct in all material respects (unless such representations and warranties contain a materiality qualification, in which case, such representations and warranties shall be true and correct as made) on and as of the date hereof as though made on and as of such date unless such representations and warranties by their terms refer to an earlier date, in which case they shall be true and correct in all material respects (unless such representations and warranties contain a materiality qualification, in which case such representations and warranties shall be true and correct as made) on and as of such earlier date;

(b) no event has occurred and is continuing, or would result from this Amendment, that constitutes an Event of Default or Unmatured Event of Default, as set forth in Section 9.01 of the Receivables Financing Agreement; and

(c) the execution and delivery by it of this Amendment, and the performance of its obligations under this Amendment and the Receivables Financing Agreement, as amended hereby, are within its organizational powers and have been duly authorized by all necessary action on its part and (ii) this Amendment and the Receivables Financing Agreement, as amended hereby, are its valid and legally binding obligations, enforceable in accordance with their respective terms, subject, as to enforcement, to bankruptcy, insolvency, reorganization and other laws of general applicability relating to or affecting creditors' rights and to general equity principles.

SECTION 4. Conditions Precedent. The effectiveness of this Amendment is subject to the satisfaction of all of the following conditions precedent:

(a) The Administrative Agent shall have received a fully executed counterpart of (i) this Amendment, (ii) the Joinder Agreement, dated as of the date hereof, by Olin Chlorine 7, LLC ("Olin Chlorine"), Olin Russellville Cell Technologies LLC ("Olin Russellville"), Olin Winchester, LLC ("Olin Winchester"), Pioneer Americas LLC ("Pioneer"), and Sunbelt Chlor Alkali Partnership ("Sunbelt Chlor"), each as an additional originator (Olin Chlorine, Olin Russellville, Olin Winchester, Pioneer and Sunbelt Chlor, each in such capacity, an "Additional Originator" and collectively, the "Additional Originators"), and consented to by the Borrower, and acknowledged by the Administrative Agent, the Group Agents and the Servicer, (iii) the Amendment No. 3 to Purchase and Sale Agreement, dated as of the date hereof, by and among Olin Finance, as buyer, the Servicer, and the Originators (as defined therein), and acknowledged and agreed to by the Administrative Agent and the Group Agents, (iv) the Amendment Fee Letter, dated as of the date hereof, by and among the Administrative Agent, the Group Agents and the Lenders, and acknowledged and agreed to by the Borrower and the Structuring Agent, and (v) with respect to each Additional Originator, (A) the Subordinated Note, dated as of the date hereof, by the Borrower in favor of such Additional Originator, (B) a certificate of the Secretary or Assistant Secretary of such Additional Originator, dated as of the date hereof, attaching (x) if such Additional Originator is a registered entity, a certified copy of the Certificate of Formation, the limited liability company agreement, the resolutions or unanimous written consent, a good standing certificate issued as of a recent date acceptable to the Administrative Agent by the Secretary of State of the State of Delaware and an incumbency certificate, and (y) if such Additional Originator is not a registered entity, the partnership agreement, the resolutions or unanimous written consent and an incumbency certificate, in each case under clause (x) and (y), of such Additional Originator, in form and substance acceptable to the Administrative Agent, and (C) a certificate from an Officer of such Additional Originator, dated as of the date hereof, certifying as to the placement of a legend on certain reports, in form and substance acceptable to the Administrative Agent (collectively, the "Amendment Documents").

(b) The Administrative Agent shall have received evidence of the filing of (i) with respect to each Additional Originator, the UCC-1 Financing Statement naming such Additional Originator as seller/debtor, the Borrower as buyer/assignor and the Administrative Agent as secured party/total assignee for filing with the Secretary of State of the State of Delaware, in form and substance acceptable to the Administrative Agent and (ii) any UCC-3 Financing Statement Amendments as the Administrative Agent shall have reasonably requested on or prior to the date hereof.

(c) The Administrative Agent and each Group Agent shall have received favorable opinions addressed to the Administrative Agent and each Group Agent, in form and substance satisfactory to the Administrative Agent and such Group Agents, from counsels to the Additional Originators covering certain corporate, enforceability, security interest, Delaware law and true sale and nonconsolidation matters as may be reasonably requested by the Administrative Agent and/or a Group Agent; provided that a favorable opinion from Missouri counsel to Olin Russellville covering certain security interest matters as may be reasonably requested by the Administrative Agent and/or a Group Agent may be provided after the date hereof pursuant to Section 7.01(y) of the Receivables Financing Agreement.

(d) The Administrative Agent shall have received such documents and certificates as the Administrative Agent shall have reasonably requested on or prior to the date hereof.

(e) No Event of Default or Unmatured Event of Default, as set forth in Section 9.01 of the Receivables Financing Agreement, shall have occurred and be continuing.

(f) PNC, as the Administrative Agent, as a Committed Lender and as the Group Agent for the PNC Group, TD Bank, as a Related Committed Lender and as the Group Agent for the TD Bank Group, and Conduit Lender, in each case, under the Receivables Financing Agreement, as applicable, shall have received all fees and other amounts due and payable to it under the Transaction Documents and in connection with the Amendment Documents on or prior to the date hereof, including, to the extent invoiced, payment or reimbursement of all fees and expenses (including reasonable and documented out-of-pocket fees, charges and disbursements of counsel) required to be paid or reimbursed on or prior to the date hereof. To the extent such fees and other amounts have not yet been invoiced, the Borrower agrees to remit payment to the applicable party promptly upon receipt of such invoice.

SECTION 5 Amendment. The Borrower, the Servicer, the Administrative Agent, the Group Agents, the Lenders, and, with respect to Section 11 hereof, the Performance Guarantor, hereby agree that the provisions and effectiveness of this Amendment shall apply to the Receivables Financing Agreement as of the date hereof. Except as amended by this Amendment, the Receivables Financing Agreement remains unchanged and in full force and effect. This Amendment is a Transaction Document.

SECTION 6. Counterparts. This Amendment may be executed in any number of counterparts, each of which when so executed shall be deemed to be an original and all of which when taken together shall constitute one and the same agreement. Delivery of an executed counterpart hereof by facsimile or other electronic means shall be equally effective as delivery of an originally executed counterpart.

SECTION 7. Captions. The headings of the Sections of this Amendment are provided solely for convenience of reference and shall not modify, define, expand or limit any of the terms or provisions of this Amendment.

SECTION 8.Successors and permitted assigns. The terms of this Amendment shall be binding upon, and shall inure to the benefit of, the Borrower, the Servicer, the Administrative Agent, the Group Agents, the Lenders, and, with respect to Section 11 hereof, the Performance Guarantor and their respective successors and permitted assigns.

SECTION 9.Severability. Any provision of this Amendment which is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such prohibition or unenforceability without invalidating the remaining provisions hereof, and any such prohibition or unenforceability in any jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.

SECTION 10.Governing Law and Jurisdiction. The provisions of the Receivables Financing Agreement with respect to governing law, jurisdiction, and agent for service of process are incorporated in this Amendment by reference as if such provisions were set forth herein.

SECTION 11.Ratification of Performance Guarantee. After giving effect to the Amendment Documents, all of the provisions of the Performance Guaranty shall remain in full force and effect and the Performance Guarantor hereby ratifies and affirms the Performance Guaranty and acknowledges that the Performance Guaranty has continued and shall continue in full force and effect in accordance with its terms.

SECTION 12. Information Packages. The Borrower and the Servicer have advised the Administrative Agent that certain of the Information Packages delivered prior to the date hereof contained information therein that was incomplete and/or incorrect with respect to Receivables originated by Olin Russellville and Olin Winchester on the date the same was furnished to the Administrative Agent. The parties hereto hereby agree that, to the extent any information set forth in an Information Package delivered after the date hereof is calculated or derived from information set forth in an Information Package delivered prior to the date hereof, the Borrower and the Servicer shall not be required to update, revise or amend such Information Packages delivered prior to the date hereof to delete therefrom the Receivables originated by Olin Russellville and Olin Winchester.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the parties hereto have executed this Amendment by their duly authorized officers as of the date first above written.

OLIN FINANCE COMPANY, LLC,
as the Borrower

By:	/s/ Teresa M. Vermillion
Name:	Teresa M. Vermillion
Title:	Vice President & Treasurer

OLIN CORPORATION,
as the Servicer

By:	/s/ Teresa M. Vermillion
Name:	Teresa M. Vermillion
Title:	Vice President & Treasurer

Acknowledged and reaffirmed by, with respect to Section 11 hereof, as of the date first written above:

OLIN CORPORATION,
as the Performance Guarantor

By:	/s/ Teresa M. Vermillion
Name:	Teresa M. Vermillion
Title:	Vice President & Treasurer

PNC BANK, NATIONAL ASSOCIATION,
as the Administrative Agent

By:	/s/ Nina Austin
Name:	Nina Austin
Title:	Senior Vice President

PNC BANK, NATIONAL ASSOCIATION,
as the Group Agent for the PNC Group

By:	/s/ Nina Austin
Name:	Nina Austin
Title:	Senior Vice President

PNC BANK, NATIONAL ASSOCIATION,
as the Committed Lender

By:	/s/ Nina Austin
Name:	Nina Austin
Title:	Senior Vice President

THE TORONTO-DOMINION BANK,
as the Group Agent for the TD Bank Group

By: /s/ Luna Mills
Name: Luna Mills
Title: Managing Director

THE TORONTO-DOMINION BANK,
as the Related Committed Lender

By: /s/ Luna Mills
Name: Luna Mills
Title: Managing Director

COMPUTERSHARE TRUST COMPANY OF CANADA, in its capacity as trustee of RELIANT TRUST, by its U.S. Financial Services Agent, the TORONTO-DOMINION BANK,
as Conduit Lender for the TD Bank Group

By: /s/ Luna Mills
Name: Luna Mills
Title: Managing Director

Acknowledged and agreed to by, as of the date first written above:

PNC CAPITAL MARKETS LLC,
as the Structuring Agent

By:	/s/ Nina Austin
Name:	Nina Austin
Title:	Senior Vice President

Exhibit A to Amendment 5 to RFA

SCHEDULE II
Lock-Boxes, Collection Accounts, Servicer Accounts and Collection Account Banks

Collection Account Bank	Lock-Box	Collection Account	Servicer Accounts

SCHEDULE III
Notice Addresses

(A) in the case of the Borrower, at the following address:

Olin Finance Company, LLC
190 Carondelet Plaza, Suite 1530
Clayton, MO 63105
Attention: Teresa M. Vermillion
Telephone: (314) 480-1443
Facsimile: (314) 480-1487
Email: TMVermillion@olin.com

(B) in the case of the Servicer, at the following address:

Olin Corporation
190 Carondelet Plaza, Suite 1530
Clayton, MO 63105
Attention: Teresa M. Vermillion
Telephone: (314) 480-1443
Facsimile: (314) 480-1487
Email: TMVermillion@olin.com

(C) in the case of PNC or the Administrative Agent, at the following address:

PNC Bank, National Association
The Tower at PNC Plaza
300 Fifth Avenue, 11th Floor
Pittsburgh, PA 15222
Attention: Brian Stanley
Telephone: (412) 768-2001
Facsimile: (412) 803-7142
Email: brian.stanley@pnc.com
ABFAdmin@pnc.com

(D) in the case of TD Bank or the Conduit Lender, at the following address:

The Toronto-Dominion Bank
130 Adelaide Street West, 12th Floor
Toronto, ON, M5H 3P5
Attention: ASG Asset Securitization
Telephone: (416) 307-6035
Email: ASGOperations@tdsecurities.com

(E) in the case of any other Person, at the address for such Person specified in the other Transaction Documents; in each case, or at such other address as shall be designated by such Person in a written notice to the other parties to this Agreement.

Exhibit 10.6

DESCRIPTION OF
RESTRICTED STOCK UNIT AWARD
GRANTED UNDER THE
OLIN CORPORATION __________ LONG TERM INCENTIVE PLAN

1. Terms

The terms and conditions of these Restricted Stock Units are contained in the Award Certificate evidencing the grant of such Award, this Award Description and in the Olin Corporation _______ Long Term Incentive Plan (the "Plan").

2. Definition

"Vesting Date" means with respect to a Restricted Stock Unit, the date on which you become entitled to receive the shares underlying the Restricted Stock Unit, as set forth in your Award Certificate.

Other capitalized terms used but not defined herein have the meanings specified in the Plan.

3. Vesting and Payment

(a) Except as otherwise provided in the Plan or in this Award Description, your interest in the Restricted Stock Units awarded to you will vest only at the close of business on the Vesting Date for such Restricted Stock Units, if you are employed by Olin from the grant date through the Vesting Date. Each Restricted Stock Unit not vested shall be forfeited.

(b) Each vested Restricted Stock Unit shall be payable by delivery of one share of Olin Common Stock (subject to adjustment as provided in the Plan), except as otherwise provided in the Plan.

(c) Each outstanding Restricted Stock Unit shall accrue Dividend Equivalents (amounts equivalent to the cash dividends payable in cash), deferred in the form of cash. Such Dividend Equivalents shall be paid only when and if the Restricted Stock Unit on which such Dividend Equivalents were accrued vests. Dividend Equivalents will accrue interest at an annual rate equal to Olin's before tax cost of borrowing as determined from time to time by the Chief Financial Officer, the Treasurer or the Controller of the Company (or in the event there is no such borrowing, the Federal Reserve A1/P1 Composite rate for 90 day commercial paper plus 10 basis points, as determined by any such officer) or such other rate as determined from time to time by the Board or the Committee, compounded quarterly, from the date accrued to the earlier of the date paid or forfeiture. To the extent a Restricted Stock Unit does not vest or is otherwise forfeited, any accrued and unpaid Dividend Equivalents (and any interest on such Dividend Equivalents) shall be forfeited.

(d) Except as otherwise specifically provided in the Plan, the total number of Restricted Stock Units (and Dividend Equivalents and related interest) that vest as of the Vesting Date shall be paid on or as soon as administratively feasible after such Vesting Date, but no later than March 15th of the calendar year following the calendar year of the Vesting Date.

(e) Restricted Stock Units shall carry no voting rights nor, except as specifically provided herein, be entitled to receive any dividends or other rights enjoyed by shareholders.

4. Termination of Employment

(a) Any Restricted Stock Units not yet vested shall be forfeited if your employment terminates either for cause or without Olin's written consent. If your employment should terminate before the applicable Vesting Date without cause and with Olin's written consent or by virtue of your death or total disability or retirement under an Olin benefit plan, the Committee shall determine, in its sole discretion, which outstanding Restricted Stock Units not yet vested (including Dividend Equivalents and related interest), if any, shall not be forfeited provided that if you are not a Section 16 officer or director of Olin when your employment terminates, the Chief Executive Officer of Olin shall be authorized to make such determination.

(b) With respect to any non-forfeited Restricted Stock Units (and Dividend Equivalents and related interest) of a terminated Participant relating to incomplete Vesting Period, you will receive shares in payment of such Restricted Stock Units (and related Dividend Equivalents and interest, if any) on or as soon as administratively feasible after your termination, but no later than March 15th of the calendar year following the calendar year of your termination, subject to the provisions of the Plan.

5. Tax Withholding

Olin will withhold from the payout of the Restricted Stock Units (and related Dividend Equivalents) the amount necessary to satisfy your federal, state and local withholding tax requirements.

6. Miscellaneous

By accepting the Award of Restricted Stock Units, you agree that such Award is special compensation, and that any amount paid will not affect

(a) The amount of any pension under any pension or retirement plan in which you participate as an employee of Olin,

(b) The amount of coverage under any group life insurance plan in which you participate as an employee of Olin, or

(c) The benefits under any other benefit plan or any kind heretofore or hereafter in effect, under which the availability or amount of benefits is related to compensation.

(d) To the extent any provision of this Award Description would subject any Participant to liability for interest or additional taxes under Code Section 409A, it will be deemed null and void, to the extent permitted by law and deemed advisable by the Committee. It is intended that this Award will be exempt from Code Section 409A (or to the extent applicable, comply with Code Section 409A), and this Award Description shall be interpreted and construed on a basis consistent with such intent. This Award Description may be amended in any respect deemed necessary (including retroactively) by the Committee in order to preserve exemption (or, if applicable, compliance) with Code Section 409A.

(e) This provision under Section 6(e) shall apply if any right you may have pursuant to this Award is considered deferred compensation under Code Section 409A.

(i) Notwithstanding Section 3(d), the payment made under Section 3(d) shall be paid no later than 60 days after the Vesting Date.

(ii) Notwithstanding Section 4(b), and subject to paragraph (iii) below, the payment made under Section 4(b) shall be paid no later than 60 days after your termination.

(iii) If you are a Specified Employee (as defined and determined under Code Section 409A) at the time you become entitled to payment under Section 4(b), then no payment which is payable upon your termination of employment as determined under Code Section 409A and not subject to an exception or exemption thereunder, shall be paid to you until the date that is six (6) months after your termination. Any such payment that would otherwise have been paid to you during this six-month period shall instead be paid to you on or as soon as administratively feasible following the date that is six (6) months after your termination, but no later than 60 days after such date. Until payment, you will continue to accrue Dividend Equivalents (and related interest) on the Restricted Stock Units as provided in Section 3(c).

(iv) A "termination of employment", "termination", or "retirement" (or other similar term having a similar import) under this Award shall have the same meaning as a "separation from service" as defined in Code Section 409A.

Exhibit 10.23

FORM OF

OLIN CORPORATION

2018 Long Term Incentive Plan

Restricted Stock Unit and Performance RSU Award

Restricted Stock Unit and Performance RSU Certificate

This certificate certifies that the employee named below has been awarded on the date hereof the number of Performance-Based Restricted Stock Units ("Performance RSUs") and the number of time-vesting Restricted Stock Units ("Restricted Stock Units") shown below.

Subject to the terms and conditions of the Olin Corporation 2018 Long Term Incentive Plan and related Award Description and the rules adopted by the Committee administering such Plan, this certificate will entitle the recipient following employment through the Vesting Date, to a payment of one share of Olin Common Stock for each Performance RSU and each Restricted Stock Unit awarded, provided that, with respect to the Performance RSUs, the relevant Performance Condition (as defined in the attached Award Description) with respect to such Performance RSUs is satisfied.

Employee: Brett A. Flaugher

Number of Performance RSUs tied to Cost Performance Condition: Up to 20,000

Number of Performance RSUs tied to Delivery Performance Condition: Up to 20,000

Number of Restricted Stock Units: 20,000

Vesting Date: February 18, 2023

Performance Conditions: As set forth in the attached Award Description

OLIN CORPORATION
By the Compensation Committee

____
Authorized Signature

____
Employee Signature

Dated: February 18, 2020

DESCRIPTION OF

RESTRICTED STOCK UNIT AWARD and PERFORMANCE RSU AWARD

GRANTED UNDER THE

OLIN CORPORATION 2018 LONG TERM INCENTIVE PLAN

1. Terms

The terms and conditions of these 20,000 time-vesting Restricted Stock Units ("Restricted Stock Units") and these 40,000 Performance-Based Restricted Stock Units ("Performance RSUs") are contained in the Award Certificate evidencing the grant of such Award, this Award Description and in the Olin Corporation 2018 Long Term Incentive Plan (the "Plan").

2. Definitions

The following capitalized terms used in this Award Description and not otherwise defined in this Award Description shall have the respective meanings set forth below:

"Affiliate" means any corporation, partnership, joint venture or other entity during any period in which Olin owns, directly or indirectly, at least 50% of the total voting securities of such entity.

"Cost Performance Condition" means that the transition costs (as set forth in the LCAAP transition budget) for Winchester Olin, LLC ("Winchester") to transition the management of the Lake City Army Ammunition Plan ("LCAAP") under the Facilities Contract awarded to Winchester by the U. S. Army (the "Contract") from the incumbent manager of LCAAP do not exceed $23,000,000.

"Delivery Performance Condition" means that Winchester delivers the Year 1 LCAAP requirements under the Contract on time and on budget.

"Exchange Act" means the Securities Exchange Act of 1934, as amended, and the regulations thereunder.

"Flaugher" means Brett A. Flaugher.

"Group" means Persons acting together for the purpose of acquiring Winchester Securities and includes owners of a Person that enters into a merger, consolidation, purchase or acquisition of assets, securities, or similar business transaction with Winchester. If a Person owns securities in both Winchester and another Person that enters into a merger, consolidation, purchase or acquisition of securities, or similar transaction, such Person is considered to be part of a Group only with respect to ownership prior to the merger or other transaction giving rise to the change and not with respect to the ownership interest in the other Person.

"Olin" means Olin Corporation.

"Olin Party" means Olin or any of its subsidiaries or any employee benefit plan (or related trust) sponsored or maintained by Olin or any of its subsidiaries.

"Person" shall have the meaning of such term in Section 3(a)(9) of the Exchange Act and as used in Sections 13(d)(3) and 14(d)(2) of the Exchange Act.

"Sale" (when the term is capitalized) means the sale or other disposition of all or substantially all of the assets of Winchester to an entity that is not an Affiliate of Olin.

"Vesting Date" means with respect to a Restricted Stock Unit or Performance RSU, the date on which you become entitled to receive the shares underlying the Restricted Stock Unit or Performance RSU, as set forth in your Award Certificate.

"Winchester Event" means that a Sale or an event or series of events where any Person other than an Olin Party is or becomes a "beneficial owner" (as such term is defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of securities representing 50% or more of the then-outstanding Winchester Securities, including as the result of a merger, consolidation, statutory share exchange or similar form of corporate transaction involving Olin or Winchester, but shall not include any acquisition of Winchester Securities by Flaugher or any Group of Persons including Flaugher (or any entity controlled by Flaugher or any Group of Persons including Flaugher).

Other capitalized terms used but not defined herein have the meanings specified in the Plan.

3. Vesting and Payment

(a) Except as otherwise provided in the Plan or in this Award Description, your interest in the Restricted Stock Units awarded to you will vest only at the close of business on the Vesting Date for such Restricted Stock Units, if you are employed by Olin from the grant date through the Vesting Date. Except as otherwise provided in the Plan or this Award Description, your interest in the Performance RSUs awarded to you will vest if, and only if, (i) you remain continuously employed by Olin or any of its subsidiaries through the Vesting Date, and (ii) the relevant Performance Condition is met.

(b) As soon as reasonably practicable after December 31, 2020, the Committee shall make a determination as to whether the Cost Performance Condition has been met. If the Cost Performance Condition has been met, 20,000 of the Performance RSUs shall vest on the Vesting Date. As soon as reasonably practicable after December 31, 2021, the Committee shall make a determination as to whether the Delivery Performance Condition has been met. If the Delivery Performance Condition has been met, 20,000 of the Performance RSUs shall vest on the Vesting Date.

(c) Each Restricted Stock Unit and Performance RSU not vested shall be forfeited.

(d) Each vested Restricted Stock Unit and Performance RSU shall be payable by delivery of one share of Olin Common Stock (subject to adjustment as provided in the Plan), except as otherwise provided in the Plan.

(e) Each outstanding Restricted Stock Unit and Performance RSU shall accrue Dividend Equivalents (amounts equivalent to the cash dividends payable in cash), deferred in the form of cash. Such Dividend Equivalents shall be paid only when and if the Restricted Stock Unit or Performance RSU on which such Dividend Equivalents were accrued vests. Dividend Equivalents will accrue interest at an annual rate equal to Olin's before tax cost of borrowing as determined from time to time by the Chief Financial Officer, the Treasurer or the Controller of the Company (or in the event there is no such borrowing, the Federal Reserve A1/P1 Composite rate for 90 day commercial paper plus 10 basis points, as determined by any such officer) or such other rate as determined from time to time by the Board or the Committee, compounded quarterly, from the date accrued to the earlier of the date paid or forfeiture. To the extent a Restricted Stock Unit or Performance RSU does not vest or is otherwise forfeited, any accrued and unpaid Dividend Equivalents (and any interest on such Dividend Equivalents) shall be forfeited.

(f) Except as otherwise specifically provided in the Plan, the total number of Restricted Stock Units and Performance RSUs (and Dividend Equivalents and related interest) that vest as of the Vesting Date shall be paid on or as soon as administratively feasible after such Vesting Date, but no later than March 15th of the calendar year following the calendar year of the Vesting Date.

(g) Restricted Stock Units and Performance RSUs shall carry no voting rights nor, except as specifically provided herein, be entitled to receive any dividends or other rights enjoyed by shareholders.

4. Termination of Employment; Winchester Event

(a) Except as provided in Section 4(b) or 4(c), if your employment with the Company and its subsidiaries terminates for any reason before the Vesting Date, your Restricted Stock Units and Performance RSUs and the related Dividend Equivalents shall terminate and all your rights related thereto shall be forfeited immediately.

(b) Any Restricted Stock Units and Performance RSUs not yet vested shall be forfeited if your employment terminates either for "Cause" as defined in the Olin Corporation Severance Plan for Section 16(b) Officers, or without Olin's written consent. If your employment should terminate before the Vesting Date without Cause and with Olin's written consent (other than in connection with a Winchester Event) or by virtue of your death or total disability or retirement under an Olin benefit plan, the Committee shall determine, in its sole discretion, which outstanding Restricted Stock Units and Performance RSUs not yet vested (including Dividend Equivalents and related interest), if any, shall not be forfeited provided that if you are not a Section 16 officer or director of Olin when your employment terminates, the Chief Executive Officer of Olin shall be authorized to make such determination.

(c) Upon the occurrence of a Winchester Event before the Vesting Date, all Restricted Stock Units and Performance RSUs shall vest.

(d) With respect to any non-forfeited Restricted Stock Units and Performance RSUs (and Dividend Equivalents and related interest) vested pursuant to Section 4(b) or 4(c), you will receive shares in payment of such Restricted Stock Units and Performance RSUs (and related Dividend Equivalents and interest, if any) on or as soon as administratively feasible after your termination or the Winchester Event (as the case may be), but no later than March 15th of the calendar year following the calendar year of such event, subject to the provisions of the Plan.

5. Tax Withholding

Olin will withhold from the payout of the Restricted Stock Units and Performance RSUs (and related Dividend Equivalents) the amount necessary to satisfy your federal, state and local withholding tax requirements.

6. Miscellaneous

(a) By accepting the Award of Restricted Stock Units and Performance RSUs, you agree that such Award is special compensation, and that any amount paid will not affect

(i) The amount of any pension under any pension or retirement plan in which you participate as an employee of Olin,

(ii) The amount of coverage under any group life insurance plan in which you participate as an employee of Olin, or

(iii) The benefits under any other benefit plan of any kind heretofore or hereafter in effect, under which the availability or amount of benefits is related to compensation.

(b) To the extent any provision of this Award Description would subject any Participant to liability for interest or additional taxes under Code Section 409A, it will be deemed null and void, to the extent permitted by law and deemed advisable by the Committee. It is intended that this Award will be exempt from Code Section 409A (or to the extent applicable, comply with Code Section 409A), and this Award Description shall be interpreted and construed on a basis consistent with such intent. This Award Description may be amended in any respect deemed necessary (including retroactively) by the Committee in order to preserve exemption (or, if applicable, compliance) with Code Section 409A.

(c) This provision under Section 6(c) shall apply if any right you may have pursuant to this Award is considered deferred compensation under Code Section 409A.

(i) Notwithstanding Section 3(f), the payment made under Section 3(f) shall be paid no later than 60 days after the Vesting Date.

(ii) Notwithstanding Section 4(b) or 4(c), and subject to paragraph (iii) below, the payment made under Section 4(b) or 4(c) shall be paid no later than 60 days after your termination or the Winchester Event (as the case may be).

(iii) If you are a Specified Employee (as defined and determined under Code Section 409A) at the time you become entitled to payment under Section 4(b), then no payment which is payable upon your termination of employment as determined under Code Section 409A and not subject to an exception or exemption thereunder, shall be paid to you until the date that is six (6) months after your termination. Any such payment that would otherwise have been paid to you during this six- month period shall instead be paid to you on or as soon as administratively feasible following the date that is six (6) months after your termination, but no later than 60 days after such date. Until payment, you will continue to accrue Dividend Equivalents (and related interest) on the Restricted Stock Units and Performance RSUs as provided in Section 3(e).

(iv) A "termination of employment", "termination", or "retirement" (or other similar term having a similar import) under this Award shall have the same meaning as a "separation from service" as defined in Code Section 409A.

Exhibit 21

SUBSIDIARIES OF OLIN CORPORATION[1]

(As of December 31, 2020)

Company	Shareholders/Members	% Ownership	Jurisdiction
Blue Cube Holding LLC	Blue Cube Spinco LLC	100	DE
Blue Cube Intermediate Holding 1 LLC	Blue Cube Holdings C.V.	100	DE
Blue Cube Intermediate Holding 2 LLC	Blue Cube Holdings C.V.	100	DE
Blue Cube International Holdings LLC	Blue Cube Spinco LLC	100	DE
Blue Cube IP LLC	Blue Cube Holding LLC	100	DE
Blue Cube Operations LLC	Blue Cube Holding LLC	100	DE
Blue Cube Spinco LLC	Olin	100	DE
Henderson Groundwater LLC	Pioneer Americas LLC	33	NV
HPCM LLC	K. A. Steel Chemicals Inc.	100	DE
Hunt Trading Co.	Olin	100	MO
Imperial West Chemical Co.	Pioneer Companies, LLC	100	NV
K. A. Steel Chemicals Inc.	Olin	100	DE
K. A. Steel International Inc.	K. A. Steel Chemicals Inc.	100	DE
KAS Muscatine LLC	K. A. Steel Chemicals Inc.	100	IA
KNA California, Inc.[2]	Imperial West Chemical Co.	100	DE
KWT, Inc.	Pioneer Water Technologies, Inc.	100	DE
Monarch Brass & Copper Corp.	Olin	100	NY
Monarch Brass & Copper of New England Corp.	Monarch Brass & Copper Corp.	100	RI
New Haven Copper Company	Monarch Brass & Copper Corp.	100	CT
Olin Benefits Management, Inc.	Olin	100	CA
Olin Business Holdings	Olin; Olin Engineered Systems, Inc.; Pioneer Americas LLC	62.05 36.15 1.80	DE
Olin Chlor Alkali Logistics Inc.	Olin; Olin Sunbelt II, Inc.	50 50	DE
Olin Chlorine 7, LLC	Blue Cube Holding LLC	100	DE
Olin Engineered Systems, Inc.	Olin	100	DE
Olin Far East, Limited	Olin	100	DE
Olin Finance Company, LLC	Olin	100	DE
Olin Financial Services Inc.	Olin	100	DE
Olin Funding Company LLC	Olin	100	DE
Olin North American Holdings, Inc.	Olin	100	DE
Olin Russellville Cell Technologies LLC	Blue Cube Operations LLC	100	DE
Olin Sunbelt II, Inc.	Olin	100	DE
Olin Winchester, LLC	Olin	100	DE
Pioneer Americas LLC	Olin Canada ULC	100	DE
Pioneer Companies, LLC	Olin North American Holdings, Inc.	100	DE
Pioneer (East), Inc.	Pioneer Companies, LLC	100	DE
Pioneer Licensing, Inc.	Pioneer Companies, LLC	100	DE
Pioneer Transportation LLC	Olin Business Holdings	100	DE
Pioneer Water Technologies, Inc.	Pioneer Companies, LLC	100	DE
Ravenna Arsenal, Inc.	Olin	100	OH
Sunbelt Chlor Alkali Partnership	Olin; Olin Sunbelt II, Inc.	69.3 30.7	DE
TriOlin, LLC	Olin	100	DE
Waterbury Rolling Mills, Inc.	Monarch Brass & Copper Corp.	100	CT
Winchester Ammunition, Inc.	Olin Winchester, LLC	100	DE
Winchester Defense, LLC	Olin	100	DE
INTERNATIONAL			
3229897 Nova Scotia Co.	Blue Cube Holding LLC	100	Nova Scotia, Canada

BC Switzerland GmbH	Nedastra Holding B.V.	100	Switzerland
Blue Cube Argentina Srl	Blue Cube Holding LLC	100	Argentina
Blue Cube Australia Pty Ltd	Blue Cube Chemicals Singapore Pte. Ltd.	100	Australia
Blue Cube Brasil Comércio de Produtos Químicos Ltda.[3]	Nedastra Holding B.V.	100	Brazil
Blue Cube Chemicals FZE	Nedastra Holding B.V.	100	UAE
Blue Cube Chemicals Hong Kong Limited	Blue Cube Chemicals Singapore Pte. Ltd.	100	Hong Kong
Blue Cube Chemicals India Private Limited	Blue Cube Chemicals Singapore Pte. Ltd.[4]	100	India
Blue Cube Chemicals Italy S.r.l.	Nedastra Holding B.V.	100	Italy
Blue Cube Chemical Korea Ltd.	Blue Cube Chemicals (Zhangjiagang) Co., Ltd.	100	Korea
Blue Cube Chemicals Singapore Pte. Ltd.	Nedastra Holding B.V.	100	Singapore
Blue Cube Chemicals Singapore Pte. Ltd. Taiwan Branch	Blue Cube Chemicals Singapore Pte. Ltd.	100	Taiwan
Blue Cube Chemicals South Africa Pty Ltd	Nedastra Holding B.V.	100	South Africa
Blue Cube Chemicals (UK) Limited	Nedastra Holding B.V.	100	United Kingdom
Blue Cube Chemicals (Zhangjiagang) Co., Ltd.	Blue Cube Chemicals Singapore Pte. Ltd.	100	China
Blue Cube Chemicals (Zhangjiagang) Co., Ltd. Shanghai Branch	Blue Cube Chemicals (Zhangjiagang) Co., Ltd.	100	China
Blue Cube Denmark ApS	Nedastra Holding B.V.	100	Denmark
Blue Cube Germany Assets GmbH & Co. KG	Blue Cube Germany Assets Management GmbH (General partner); Nedastra Holding B.V. (Limited partner)	0 100	Germany
Blue Cube Germany Assets Management GmbH	Nedastra Holding B.V.	100	Germany
Blue Cube Germany Productions Management GmbH	Nedastra Holding B.V.	100	Germany
Blue Cube Holdings C.V.	Blue Cube International Holdings LLC; Blue Cube Holding LLC	99.99 0.01	Netherlands
Blue Cube Japan LLC	Blue Cube Chemicals Singapore Pte. Ltd.	100	Japan
Blue Cube Mexico, S. de R.L. de C.V.	Blue Cube Holding LLC; Blue Cube Operations LLC	98 02	Mexico
Blue Cube Netherlands B.V.	Olin International Holdings Limited	100	Netherlands
Blue Cube Poland Sp.z.o.o.	Nedastra Holding B.V.	100	Poland
Blue Cube Rasha OOO	Nedastra Holding B.V.; Blue Cube Netherlands B.V.	99.995 0.005	Russia
Blue Cube Servicios Administrativos S. de R. L. de C.V.	Blue Cube Holding LLC; Blue Cube Operations LLC	90 10	Mexico
Blue Cube (Thailand) Company Limited	Blue Cube Holding LLC; Blue Cube Operations LLC; Blue Cube IP LLC	99.998 0.001 0.001	Thailand
Blue Cube (Thailand) Company Limited Hong Kong Branch	Blue Cube (Thailand) Company Limited	100	Hong Kong
Blue Cube Turkey Kimyasal Ürünler Limited Şirketi	Nedastra Holding B.V.	100	Turkey
CANSO Chemicals Limited	Olin Canada ULC	50	Nova Scotia, Canada
Nedastra Holding B.V.	Olin International Holdings Limited	100	Netherlands
Niloco Cyprus Limited	Olin International Holdings Limited	100	Cyprus
Nutmeg Insurance Limited	Olin	100	Bermuda
Olin Canada ULC	Olin North American Holdings, Inc.	100	Nova Scotia, Canada
Olin Germany AP LTP GmbH	Blue Cube Germany Assets GmbH & Co. KG	100	Germany
Olin Germany Upstream GmbH & Co. KG	Blue Cube Germany Assets GmbH & Co. KG	100	Germany
Olin Hunt Specialty Products S.r.l.	Olin; Hunt Trading Co.	99 01	Italy
Olin International Holdings Limited	Blue Cube Intermediate Holding 2 LLC; Blue Cube Intermediate Holding 1 LLC	99.496 0.504	United Kingdom
Winchester Australia Limited	Olin	100	Australia

Footnotes:

1 Omitted from the following list are the names of certain subsidiaries which, if considered in the aggregate as a single subsidiary, would not constitute a significant subsidiary

2 In California only, this entity conducts business under the name of Kemwater KNA California, Inc.

3 Subordinates of Blue Cube Brasil Comércio de Produtos Químicos Ltda.:

- Sâo Paulo Branch of Blue Cube Brasil Comércio de Produtos Químicos Ltda.
- Bahia Branch of Blue Cube Brasil Comércio de Produtos Químicos Ltda. (Caustic Soda)
- Paraná Branch of Blue Cube Brasil Comércio de Produtos Químicos Ltda. (Caustic Soda)

4 Blue Cube Chemicals Singapore Pte. Ltd. holds 41,259,999 equity shares and Blue Cube Chemicals Hong Kong Limited holds 1 equity share

Exhibit 23

Consent of Independent Registered Public Accounting Firm

The Board of Directors
Olin Corporation:

We consent to the incorporation by reference in the registration statements No. 333-237060 on Form S-3 and Nos. 333-18619, 333-39305, 333-35818, 333-97759, 333-110135, 333-110136, 333-124483, 333-133731, 333-148918, 333-158799, 333-166288, 333-176432, 333-195500, 333-209534, 333-211434, and 333-224569 on Form S-8 of Olin Corporation of our report dated February 22, 2021, with respect to the consolidated balance sheets of Olin Corporation as of December 31, 2020 and 2019, the related consolidated statements of operations, comprehensive income (loss), shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2020, and the related notes (collectively, the consolidated financial statements), and the effectiveness of internal control over financial reporting as of December 31, 2020, which report appears in the December 31, 2020 annual report on Form 10-K of Olin Corporation.

Our report refers to a change in the accounting method for leases due to the adoption of Accounting Standards Update 2016-02 - *Leases* and amendments thereto as of January 1, 2019.

/s/ KPMG LLP

St. Louis, Missouri
February 22, 2021

Exhibit 31.1

CERTIFICATIONS

I, Scott Sutton, certify that:

1. I have reviewed this annual report on Form 10-K of Olin 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: February 22, 2021

/s/ Scott Sutton
Scott Sutton
President and Chief Executive Officer

Exhibit 31.2

CERTIFICATIONS

I, Todd A. Slater, certify that:

1. I have reviewed this annual report on Form 10-K of Olin 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:	February 22, 2021	/s/ Todd A. Slater
		Todd A. Slater Vice President and Chief Financial Officer

Exhibit 32

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

In connection with the Annual Report of Olin Corporation (the "Company") on Form 10-K for the period ended December 31, 2020 as filed with the Securities and Exchange Commission (the "Report"), I, Scott Sutton, President and Chief Executive Officer and I, Todd A. Slater, Vice President and Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to our knowledge: (1) the Report fully complies with the requirements of Section 13(a) of the Securities Exchange Act of 1934; and (2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its Staff upon request.

/s/ Scott Sutton
Scott Sutton
President and Chief Executive Officer

Dated: February 22, 2021

/s/ Todd A. Slater
Todd A. Slater
Vice President and Chief Financial Officer

Dated: February 22, 2021