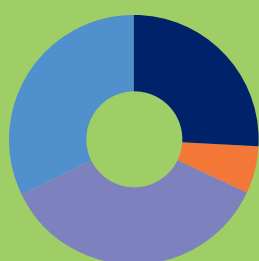




A world of brilliance.



(Millions of U.S. dollars, except share and per share amounts) ⁽¹⁾	2019	2018	2017	2016
Sales	\$2,642	\$ 1,819	\$ 1,698	\$ 1,309
Net income (loss) from continuing operations	\$ (102)	\$ 30	\$ (93)	\$ (139)
Diluted loss per share from continuing operations	\$ (0.81)	\$ (0.06)	\$ (0.89)	\$ (1.20)
Dividend paid per share	\$ 0.18	\$ 0.18	\$ 0.18	\$ 0.385
Total assets	\$5,268	\$4,642	\$4,864	\$3,293
Shares outstanding (at December 31)	141,900,459	122,933,845	121,270,743	116,319,952



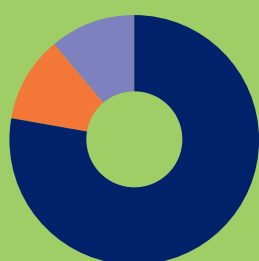
SALES REVENUE DISTRIBUTION BY GEOGRAPHY⁽¹⁾

- 26% North America
- 6% South and Central America
- 36% Europe, Middle East and Africa
- 32% Asia-Pacific



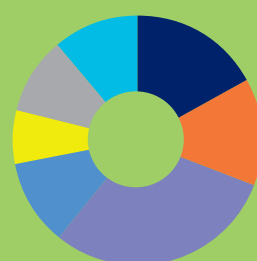
SALES VOLUME DISTRIBUTION BY END USE⁽¹⁾

- 73% Paints and Coatings
- 19% Plastics
- 8% Paper and Specialty



REVENUE FROM PRODUCT SALES⁽¹⁾

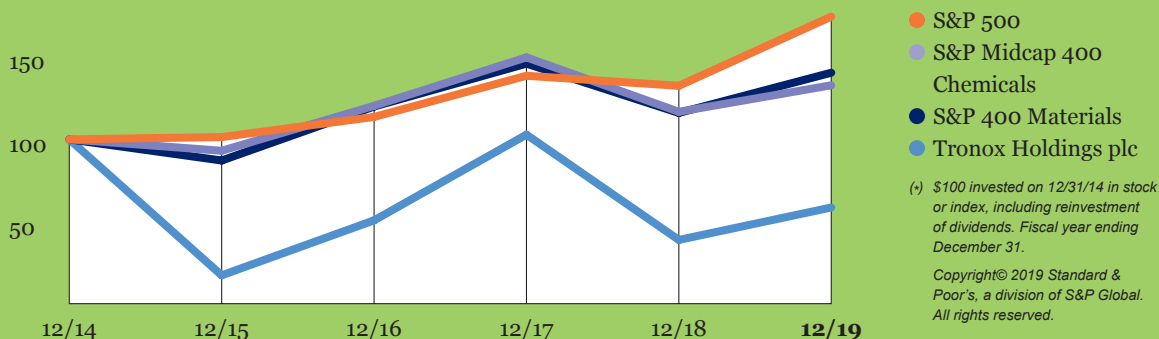
- 78% TiO₂
- 11% Zircon
- 11% Feedstock and Other Products



FULL-TIME EMPLOYEES BY REGION⁽¹⁾

- 17% Australia
- 14% Europe
- 30% South Africa
- 11% North America
- 7% South America
- 10% KSA
- 11% Asia-Pacific

COMPARISON OF 5-YEAR CUMULATIVE TOTAL RETURN*



(*) \$100 invested on 12/31/14 in stock or index, including reinvestment of dividends. Fiscal year ending December 31.

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(1) The following information is from our Form 10-K for the year ended December 31, 2019, filed with the Securities and Exchange Commission on March 16, 2020.

Dear Fellow Shareholders:

The year 2019 may be the year that goes down in our company history as having the greatest influence on changing the trajectory of Tronox. It was truly a year of transformation.

Not surprisingly, the most notable achievement was completing the acquisition of Cristal's titanium dioxide business in April 2019. After two years of regulatory hurdles, we brought together two great companies, each with its own rich history, and together, we made tremendous strides in integrating our people, our processes and our commercial approach to create One Tronox — and a whole new world of brilliance for our employees, our customers and our shareholders.

We also made tremendous progress in creating a high-performance culture defined by our shared core values, which transcend geographic and cultural boundaries. As a widespread global organization, we have many differences, but we have already learned that there is more that unites us than divides us. Our values are strong and the core of our foundation. They are statements that guide us in how we interact with each other, our customers, our suppliers and the communities in which we operate. It is through these values that we are guided in our efforts to produce Safe, Quality, Low-cost Tons for our customers and exceptional returns for our shareholders.

In March 2019, we hit a milestone by redomiciling to the United Kingdom from Australia, thereby enhancing our ability to repurchase shares. Then in June, the Board of Directors authorized the purchase of up to \$100 million of the company's stock. This authorization to repurchase shares is consistent with our long-term capital allocation priorities of

deleveraging, investing in high-return organic projects to lower our costs and opportunistically returning capital to shareholders.

We also welcomed new members to our Board of Directors, including Dr. Vanessa Guthrie and Stephen Jones, and two designees from our largest shareholder, Cristal International Holdings B.V., Mutlaq Al-Morished and Moazzam Khan. Former Cristal Chairman Dr. Talal Al Shair, became an honorary Director Emeritus.

REMARKABLE EXECUTION

Our financial performance in 2019 was driven by strong execution on the many operating and commercial initiatives that were within our control, such as delivering synergies through our accelerated acquisition integration program, optimizing our global vertically-integrated footprint, managing our cost structure and wisely allocating capital.

I am particularly proud of the Tronox team for not only reaching our synergy target of \$40 million, but exceeding it, achieving \$89 million in savings in 2019. The value of the combination of Tronox and Cristal continues to unfold, and we intend to continue to exceed our originally stated synergy targets over the next few years.

Delivering the synergies is only one part of our operational excellence program. Our global team is relentlessly driving to lower our cost per ton across all our operations, increasing product quality, optimizing our global footprint and most importantly, continually improving our safety performance on our Journey to Zero, as we call this initiative within Tronox.

SUSTAINABILITY COMMITMENT

Our safety mission is to achieve zero incidents and zero harm. We adhere to the highest standards for the safe operation of our facilities and the protection of our environment, employees, contractors, customers and

One Tronox:

- Largest vertically integrated producer
- Second largest TiO₂ pigment producer
- Second largest mineral sands producer
- One of the world's largest producers of zircon and high-grade feedstock
- Nearly 7,000 employees worldwide
- Nine TiO₂ manufacturing plants and nine mineral sands facilities across six continents
- Industry's broadest product offering and technology portfolio
- 2019 revenue of \$2.642 B

of the communities in which we do business. We believe that all injuries and occupational illnesses, as well as process safety and environmental incidents, are preventable. In pursuit of this mission, we've maintained a relentless focus on safety and enhanced our commitment to sustainability efforts, including the appointment of a Chief Sustainability Officer to manage our ESG initiatives.

PRODUCT EXCELLENCE

With responsible operations comes the promise to our customers to deliver consistent product quality and performance. By combining the Tronox and Cristal product portfolios, we boast the leading, most comprehensive titanium dioxide offerings available. We are successfully bringing all of our TiO₂ products under the TiONA® brand, which has decades of positive reputation in our key markets. We also enjoy a leadership position in the specialty TiO₂ markets, with our CristalACTiV™ range of ultrafine TiO₂ products that are at the core of depollution technologies that contribute to a cleaner world.

FOSTERING OUR TALENT

Of course, none of our success would be possible without our employees. Investing in and developing our people is a key focus area. To this end, we've renewed our employee development initiatives, including improving diversity and inclusion. As an organization, we are committed to fostering our talent, providing learning and development opportunities, and attracting and building the workforce that will help sustain and grow Tronox for the future.

THE YEAR AHEAD

Unexpectedly, the world is facing a year like none other. With the global COVID-19 pandemic changing the way we live, work and interact, we are experiencing a historic and monumental event. Our focus during this crisis continues to be on protecting the health and safety of our employees. We have implemented stringent and prudent controls at all of our locations to this end.

Our Tronox Values:

- We have an uncompromising focus on operating safe, reliable and responsible facilities
- We honor our responsibility to create value for stakeholders
- We treat others with respect and act with personal and organizational integrity
- We build our organization with diverse, talented people who make a positive difference and we invest in their success
- We are adaptable, decisive and effective
- We are trustworthy and reliable, and we build mutually rewarding relationships
- We share accountability and have high expectations for ourselves and one another
- We do the right work the right way in every aspect of our business
- We celebrate the joy of working together to accomplish great things

In the majority of the jurisdictions where Tronox operates, we are considered an essential business. Our ores, pigment products and specialty chemicals are the building blocks for many items that are needed to produce life-protecting, life-monitoring and life-saving products — products essential to seeing the global community through this difficult time. Our dedicated employees everywhere have risen to the occasion. We are not only protecting our business by maintaining our operations, we are contributors to a cause much bigger than ourselves. We operate for our customers and our communities. Our products are vital to components and products used on the front lines to protect workers and patients alike against the coronavirus. Keeping our business going — by working together — is how we are making a difference.

Despite the disruptions caused by the pandemic, our global team is moving forward in 2020 together as one new Tronox. We remain focused on execution, and delivery of our vertical integration strategy, which is creating an enterprise that displays greater stability in financial performance and cash generation throughout the cycle. We will continue to manage what we can control — achieving the increased synergy targets, investing in our business through well-conceived, well-executed high return projects, deleveraging the balance sheet, and returning capital to shareholders through an increased dividend. We believe 2019 evidenced those capabilities and we look forward to continuing to demonstrate them in 2020. There really is a world of brilliance ahead of us.

Sincerely,



Jeffrey N. Quinn
Chairman and Chief Executive Officer
Tronox Holdings plc

BOARD OF DIRECTORS

Jeffry N. Quinn
Chairman and Chief
Executive Officer,
Tronox Holdings plc

Ilan Kaufthal⁽³⁾
Lead Independent
Director, Tronox
Holdings plc
Eastwind Advisors

Mutlaq Al-Morished
Chief Executive Officer,
TASNEE

Vanessa Guthrie^(1,3)
Non-executive Director
of Santos Limited and
Adelaide Brighton Ltd.

Andrew P. Hines^{(1,3)**}
Principal, Hines &
Associates

Wayne A. Hinman^{(2,3)**}
Former Vice President
and General Manager,
Worldwide Merchant
Gases, Air Products &
Chemicals, Inc.

Peter B. Johnston^(1,2)
Former Interim Chief
Executive Officer,
Tronox Limited; Former
Global Head of Nickel
Assets, Glencore

Ginger M. Jones^(1,2)
Former Senior Vice
President and Chief
Financial Officer, Cooper
Tire & Rubber Company

Stephen Jones^(1,2*)
President and Chief
Executive Officer,
Covanta

Moazzam Khan
Managing Director,
Cristal International
Holdings B.V.

Sipho Nkosi^(2,3)
Former Chief
Executive Officer,
Exxaro Resources

(1) Audit

*(2) Human Resources and
Compensation*

*(3) Corporate Governance
and Nominating*

() Chair*

*** Messrs. Hines and Hinman
will not be seeking re-election
to the Board at the 2020 AGM.*

EXECUTIVE MANAGEMENT TEAM

Jeffry N. Quinn
Chairman and Chief
Executive Officer,
Tronox Holdings plc

John D. Romano
Executive Vice President
and Chief Commercial
and Strategy Officer

Jean-François Turgeon
Executive Vice President
and Chief Operating
Officer

Timothy C. Carlson
Senior Vice President
and Chief Financial
Officer

Chuck Mancini
Senior Vice President,
Chief Human Resources
Officer

Jeffrey Neuman
Senior Vice President,
General Counsel and
Corporate Secretary

John Srivisal
Senior Vice President,
Business Development
and Chief Integration
Officer

Willem Van Niekerk
Senior Vice President,
Business Transformation

Melissa H. Zona
Senior Vice President,
External Affairs and
Chief Sustainability
Officer

Jennifer Guenther
Vice President, Investor
Relations

Robert Loughran
Vice President,
Controller

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

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the Year ended December 31, 2019

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from _____ to _____
1-35573
(Commission file number)

TRONOX HOLDINGS PLC

(Exact name of registrant as specified in its charter)

England and Wales
(State or other jurisdiction of incorporation or organization)

98-1467236
(I.R.S. Employer Identification No.)

263 Tresser Boulevard,
Suite 1100
Stamford
Connecticut
06901

Laporte Road, Stallingborough
Grimsby, North East Lincolnshire, DN40 2PR
United Kingdom

Registrant's telephone number, including area code: (203) 705-3800

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

Title of each class	Name of each exchange on which registered
Ordinary Shares, par value \$0.01 per share	New York Stock Exchange

Trading Symbol: TROX

Securities registered pursuant to Section 12(g) of the Act: None

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

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

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

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

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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

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

The aggregate market value of the ordinary shares held by non-affiliates of the registrant as of June 30, 2019 was approximately \$1,845,141,753.

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Section 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes No

As of January 31, 2020, the registrant had 141,995,900 ordinary shares outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement for its 2020 annual general meeting of shareholders are incorporated by reference in this Form 10-K in response to Part III Items 10, 11, 12, 13 and 14.

TRONOX HOLDINGS PLC
ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2019
INDEX

Form 10-K Item Number	Page
PART I	
Item 1. Business	1
Item 1A. Risk Factors	11
Item 1B. Unresolved Staff Comments	28
Item 2. Properties	28
Item 3. Legal Proceedings	37
Item 4. Mine Safety Disclosures	37
PART II	
Item 5. Market for Registrant’s Common Equity, Related Shareholder Matters and Issuer Purchases of Equity Securities	38
Item 6. Selected Financial Data	38
Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations	40
Item 7A. Quantitative and Qualitative Disclosures About Market Risk	62
Item 8. Financial Statements and Supplementary Data	64
Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure	118
Item 9A. Controls and Procedures	118
Item 9B. Other Information	119
PART III	
Item 10. Directors, Executive Officers and Corporate Governance	120
Item 11. Executive Compensation	120
Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Shareholder Matters	120
Item 13. Certain Relationships and Related Transactions, and Director Independence	120
Item 14. Principal Accounting Fees and Services	121
PART IV	
Item 15. Exhibits, Financial Statement Schedules	122
Item 16. Form 10-K Summary	125
SIGNATURES	126

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

We have made statements under the captions “Business,” “Risk Factors,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations”, and in other sections of this Form 10-K that are forward-looking statements. Forward-looking statements also can be identified by words such as “future,” “anticipates,” “believes,” “estimates,” “expects,” “intends,” “plans,” “predicts,” “will,” “would,” “could,” “can,” “may,” and similar terms. These forward-looking statements, which are subject to known and unknown risks, uncertainties and assumptions about us, may include projections of our future financial performance based on our growth strategies and anticipated trends in our business. These statements are only predictions based on our current expectations and projections about future events. There are important factors that could cause our actual results, level of activity, performance or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements. In particular, you should consider the numerous risks and uncertainties outlined in “Risk Factors.”

These risks and uncertainties are not exhaustive. Other sections of this Form 10-K may include additional factors, which could adversely impact our business and financial performance. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time, and it is not possible for our management to predict all risks and uncertainties, nor can management assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements.

Although we believe the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. Moreover, neither we nor any other person assumes responsibility for the accuracy or completeness of any of these forward-looking statements. You should not rely upon forward-looking statements as predictions of future events. Unless otherwise required by applicable law, we are under no duty to update any of these forward-looking statements after the date of this Form 10-K to conform our prior statements to actual results or revised expectations and we do not intend to do so.

When considering forward-looking statements, you should keep in mind the risks, uncertainties and other cautionary statements made in this Form 10-K and the documents incorporated by reference, including, in particular, the factors discussed below. These factors may be revised or supplemented in subsequent reports on Forms 10-Q and 8-K.

Factors that may affect future results include, but are not limited to:

- we may not realize anticipated benefits of the Cristal Transaction and may experience unexpected difficulties integrating Cristal’s operations;
- concentrated share ownership in the hands of Cristal and Exxaro, which may result in conflicts of interest and/or prevent minority shareholders from influencing the Company;
- English law and our articles of association may limit our flexibility to manage our capital structure and/or have anti-takeover effects;
- the risk that our customers might reduce demand for our products;
- market conditions and price volatility for titanium dioxide (“TiO₂”), zircon and other feedstock products, as well as global and regional economic downturns, that adversely affect the demand for our end-use products;
- liability, production delays and additional expenses from environmental and industrial accidents;
- equipment upgrades, equipment failures and deterioration of assets may lead to production curtailments, shutdowns or additional expenditures;
- changes in prices or supply of energy or other raw materials may negatively impact our business;
- we are exposed to risks of operating a global business;
- political and social instability, and unrest, in the Middle East region;
- an unpredictable regulatory environment in South Africa where we have significant mining and beneficiation operations, including amendments by the South African Department of Mineral Resources to the Mining Charter;

- the risk that our ability to use our tax attributes to offset future income may be limited;
- that the agreements governing our debt may restrict our ability to operate our business in certain ways, as well as impact our liquidity;
- our inability to obtain additional capital on favorable terms;
- the risk that we may not realize expected investment returns on our capital expenditure projects;
- fluctuations in currency exchange rates;
- compliance with, or claims under environmental, health and safety regulations may result in unanticipated costs or liabilities, including the classification of TiO₂ as a Category 2 Carcinogen in the EU, which could have an adverse impact on our business;
- the possibility that cybersecurity incidents or other security breaches may seriously impact our results of operations and financial condition; and
- Chinese production of chloride technology and improvements in product quality may occur more quickly than anticipated.

We are committed to providing timely and accurate information to the investing public, consistent with our legal and regulatory obligations. To that end, we use our website to convey information about our businesses, including the anticipated release of quarterly financial results, quarterly financial and statistical and business-related information. Investors can access announcements about the Company through our website available at <http://www.tronox.com>. Our website is included as an inactive textual reference only and the information contained therein or connected thereto shall not be deemed to be incorporated into this Form 10-K.

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PART I

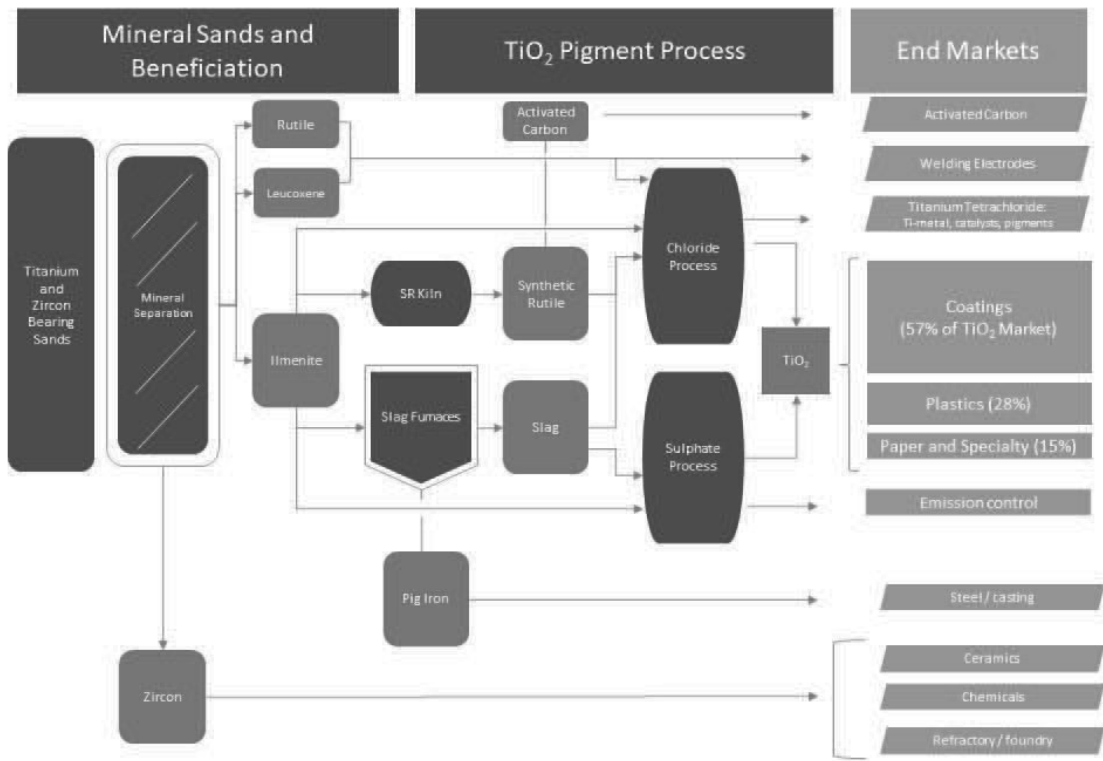
For the purposes of this discussion, references to “we,” “us,” and, “our” refer to Tronox Holdings plc, together with its consolidated subsidiaries (collectively referred to as “Tronox” or the “Company”).

Item 1. Business

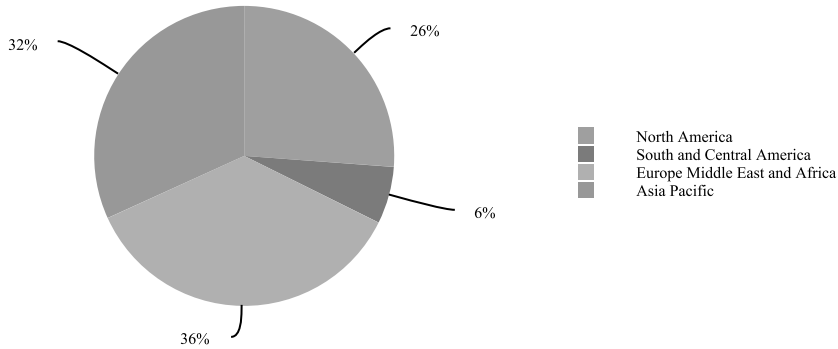
Overview

Tronox is the world’s leading vertically integrated manufacturer of TiO_2 pigment. We operate titanium-bearing mineral sand mines and beneficiation and smelting operations in Australia, South Africa and Brazil to produce feedstock materials that can be processed into TiO_2 for pigment, high purity titanium chemicals, including titanium tetrachloride, and ultrafine TiO_2 used in certain specialty applications. It is our long-term strategic goal to be fully vertically integrated and consume all our feedstock materials in our 9 TiO_2 pigment facilities located in the United States, Australia, Brazil, UK, France, the Netherlands, China and the Kingdom of Saudi Arabia (“KSA”). We believe that full vertical integration is the best way to achieve our ultimate goal of delivering low cost, high-quality pigment to our approximately 1,200 TiO_2 customers throughout the world. The mining, beneficiation and smelting of titanium bearing mineral sands also creates meaningful quantities of zircon, which we also supply to customers around the world.

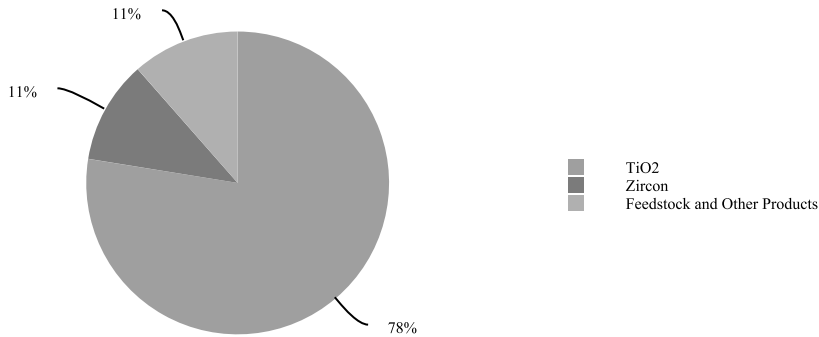
The following chart highlights the TiO_2 value chain we participate in:



The following sets forth the percentage of our revenue derived from sales of our products by geographic region for the year ended December 31, 2019. These percentages include on a reported basis the revenue derived from the Cristal business as of the closing of the Cristal Transaction (as defined below).



The below sets forth the percentage of our revenue derived from sales of our products for the year ended December 31, 2019. These percentages include on a reported basis the revenue derived from the Cristal business as of the closing of the Cristal Transaction.



For further financial information regarding our products and geographic regions, see the section entitled “Management’s Discussion and Analysis of Financial Condition and Results of Operations”, as well as Notes 5 and 25 of notes to our consolidated financial statements, each included elsewhere in this Form 10-K.

2019 Key Strategic Initiatives

The following sets forth the key strategic initiatives undertaken during 2019 that we believe will set a strong foundation for our future growth and results of operations.

Cristal Acquisition

On April 10, 2019, we completed the acquisition from National Industrialization Company (“Tasnee”) of the TiO₂ business of The National Titanium Dioxide Company Ltd., a limited company organized under the laws of the Kingdom of Saudi Arabia (“Cristal”) (the “Cristal Transaction”). In order to obtain regulatory approval for the Cristal Transaction, the Federal Trade Commission required us to divest Cristal’s North American TiO₂ business, which we sold to INEOS on May 1, 2019, for cash proceeds of approximately \$701 million, net of transaction costs and a working capital adjustment. The operating results of Cristal’s North American TiO₂ business, from the acquisition date to the date of divestiture, are included in a single caption entitled “Loss from discontinued operations, net of tax” in our audited Condensed Consolidated Statements of Operations.

In addition, in order to obtain regulatory approval by the European Commission, we divested the 8120 paper laminate grade, supplied from our Botlek facility in the Netherlands, to Venator Materials PLC (“Venator”). The divestiture was completed on April 26, 2019. Under the terms of the divestiture, we will supply the 8120 paper laminate grade product to Venator under a supply agreement for an initial term of 2 years, and extendable up to 3 years, to allow for the transfer of the manufacturing of the 8120 paper laminate grade to Venator. Total cash consideration is 8 million Euros, of which 1 million Euros was paid at the closing and the remaining 7 million Euros will be paid in equal installments during the second quarters of 2020 and 2021.

The operating results of the 8120 paper laminate grade from the date of divestiture are included within Feedstock and Other Products. For further information regarding the financial impact of the 8120 paper laminate grade, see Note 3 in notes to consolidated financial statements.

Jazan Slagger and Option Agreement

On May 9, 2018, we entered into an Option Agreement (the “Option Agreement”) with Advanced Metal Industries Cluster Company Limited (“AMIC”) pursuant to which AMIC granted us an option (the “Option”) to acquire 90% of a special purpose vehicle (the “SPV”), to which AMIC’s ownership in a titanium slag smelter facility (the “Slagger”) in “The Jazan City for Primary and Downstream Industries” in KSA will be contributed together with \$322 million of indebtedness currently held by AMIC (the “AMIC Debt”). The execution of the Option Agreement occurred shortly after we entered into a Technical Services Agreement (the “Technical Services Agreement”) with AMIC pursuant to which we agreed to immediately commence providing technical assistance to AMIC to facilitate the start-up of the Slagger. Tasnee and Cristal each own 50% of AMIC. The strategic intent of the Option Agreement and Technical Services Agreement is to enable us to further optimize the vertical integration between our TiO₂ pigment production and TiO₂ feedstock production after the closing of the Cristal Transaction. Pursuant to the Option Agreement and during its term, we agreed to lend AMIC and, upon the creation of the SPV, the SPV up to \$125 million for capital expenditures and operational expenses intended to facilitate the start-up of the Slagger. Such funds may be drawn down by AMIC and the SPV, as the case may be, on a quarterly basis as needed based on a budget reflecting the anticipated needs of the Slagger start-up. The obligation to fund up to \$125 million is contingent on our continued reasonable belief that such amounts will be sufficient (in addition to any amounts supplied by AMIC) to bring the Slagger up to certain sustained production levels. If we do not acquire the Slagger for any reason, the loans mature on the date that is eighteen months from the termination of the Option Agreement. Pursuant to the Option Agreement, subject to certain conditions, we may exercise the Option at any time on or prior to May 9, 2023. If the Slagger achieves certain production criteria related to sustained quality and tonnage of slag produced (and the other conditions referenced above are satisfied), we anticipate AMIC may require us to acquire the Slagger (the “Put”). If the Option or Put is exercised, we will acquire a 90% ownership interest in the SPV. As of December 31, 2019, we have loaned \$89 million (\$25 million during the year ended December 31, 2019) for capital expenditures and operational expenses to facilitate the start-up of the Slagger.

Re-Domiciliation from Australia to the United Kingdom

On March 27, 2019, we re-domiciled to the United Kingdom from Australia (“Re-domicile Transaction”) and became Tronox Holdings plc, a public limited company registered under the laws of England and Wales. The Re-domicile Transaction was affected by “top-hatting” Tronox Limited with Tronox Holdings plc whereby the Class A ordinary shares and Class B ordinary shares of Tronox Limited were exchanged on a 1:1 basis for ordinary shares in Tronox Holdings plc. As a result, the Class A ordinary shares of Tronox Limited were delisted from the New York Stock Exchange (“NYSE”) and the ordinary shares of Tronox Holdings plc were listed on the NYSE in its place. Tronox Limited also became a wholly-owned subsidiary of Tronox Holdings plc following the completion of the Re-domicile Transaction. The Re-domicile Transaction had an impact on capital gains tax for our ordinary shares held by Exxaro Resources Limited (“Exxaro”). See Note 24 in notes to consolidated financial statements for a discussion of our agreement with Exxaro associated with the South African capital gains tax.

Our Principal Products

TiO₂

TiO₂ Pigment

TiO₂ pigment is used in a wide range of products due to its ability to impart whiteness, brightness, and opacity. TiO₂ pigment is used extensively in the manufacture of paint and other coatings, plastics and paper, and in a wide range of other applications. Moreover, it is a critical component of everyday consumer applications due to its superior ability to cover or mask other materials effectively and efficiently relative to alternative white pigments and extenders. TiO₂ pigment is considered to be a quality of life product. At present, it is our belief that there is no effective substitute for TiO₂ pigment because no other white pigment has the physical properties for achieving comparable opacity and brightness, or can be incorporated as cost effectively.

Ultrafine Specialty TiO₂

We use the sulfate process at our manufacturing facility in Thann, France to produce ultrafine TiO₂ products. We market ultrafine TiO₂ products under the CristalActiv® trademark. Ultrafine TiO₂ has highly catalytic properties due to the relatively high surface area of each TiO₂ molecule. The principal use of ultrafine TiO₂ products are in NOx emission control products utilized in stationary, mobile and marine applications.

In 2019, inclusive of the revenue derived from the Cristal business as of the closing of the Cristal Transaction, we generated \$2.0 billion in revenue on a reported basis from sales of TiO₂.

Zircon

Zircon (ZrSiO₄) is a co-product of mining mineral sands deposits for titanium feedstock. Zircon is primarily used as an additive in ceramic glazes, which makes the ceramic glaze more water, chemical and abrasion resistant. It is also used for the production of zirconium metal and zirconium chemicals, in refractories, as molding sand in foundries, and for TV screen glass, where it is noted for its structural stability at high temperatures and resistance to abrasive and corrosive conditions. Zircon typically represents a relatively low proportion of the in-situ heavy mineral sands deposits, but has a relatively high value compared to other heavy mineral products. Refractories containing zircon are expensive and are only used in demanding, high-wear and corrosive applications in the glass, steel and cement industries. Foundry applications use zircon when casting articles of high quality and value where accurate sizing is crucial, such as aerospace, automotive, medical, and other high-end applications.

In 2019, inclusive of the revenue derived from the Cristal business as of the closing of the Cristal Transaction, we generated \$290 million in revenue on a reported basis from sales of zircon.

Feedstock and Other Products

Feedstock

Most TiO₂ products are derived from three minerals: ilmenite, leucoxene and rutile. Ilmenite, rutile, leucoxene, as well as two materials processed from ilmenite, namely, titanium slag and synthetic rutile, are all primarily used as feedstock for the production of TiO₂ pigment. Titanium slag is produced by smelting ilmenite in an electric arc furnace to separate titanium-oxide from the iron and other impurities. Synthetic rutile is produced by reducing ilmenite in a rotary kiln, followed by leaching under various conditions to remove the metallic iron from the reduced ilmenite grains. The purpose of both processes is to increase the titanium concentration of the ilmenite. There is substantial overlap amongst each of the aforementioned with the primary differentiating factor being the level of titanium content. For instance, rutile has the highest titanium dioxide content of approximately 94% to 96%, while ilmenite has the lowest of approximately 45% to 65%. We expect that revenue associated with sales of feedstock will decline as we continue to pursue our vertical integration strategy.

High Purity Pig Iron

During the process of smelting ilmenite at our smelters to increase the concentration of titanium and produce titanium slag, high purity pig iron is produced as a co-product. High purity pig iron is used as a raw material in foundries for the production of high-quality ductile iron castings. Ductile iron is used extensively throughout the world for the production of safety critical automotive parts, such as engine blocks, brake calipers and steering knuckles in cars and trucks.

Titanium Tetrachloride

Following the closing of the Cristal Transaction, we now sell titanium tetrachloride (“TiCl₄”) from our facilities in Thann, France and Yanbu, KSA. At our Thann facility in France, we produce TiCl₄ dedicated for sale to customers for use mainly in the production of various types of pigments and catalyst products. At our Yanbu facility, we produce TiCl₄ as an intermediate product for the production of TiO₂ pigment. We produce excess TiCl₄ which we sell directly to AMIC for use at a sponge plant facility, which started production in the second half of 2019.

In 2019, inclusive of the revenue derived from the Cristal business as of the closing of the Cristal Transaction, we generated \$303 million in revenue on a reported basis from the sale of feedstock and other

products, which also includes revenue generated from the 8120 paper laminate grade since the date of divestiture to Venator. Revenue from 8120 paper laminate grade shall be included within Feedstock and Other products until the expiration date of the supply agreement with Venator.

In addition, the demand for certain of our products during a given year is subject to seasonal fluctuations. See “Risk Factors – Risks Relating to our Business - The markets for many of our products have seasonally affected sales patterns”.

Mining and Beneficiation of Mineral Sands Deposits

Our current operational mining and beneficiation of mineral sands deposits are comprised of the following:

- KwaZulu-Natal (“KZN”) Sands operations located on the eastern coast of South Africa consisting of the Fairbreeze mine, a concentration plant, a mineral separation plant and two smelting furnaces that produce titanium slag;
- Our Namakwa Sands operations located on the western coast of South Africa consisting of the Namakwa mine, two concentration plants, a mineral separation plant, as well as two smelting furnaces that produce titanium slag;
- Our Northern Operations complex in Western Australia consisting of the Cooljarloo dredge mine and floating heavy mineral concentration plant and the Chandala metallurgical site which includes a mineral separation plant and a synthetic rutile plant that produces synthetic rutile;
- Our Murray Basin operations in New South Wales, Australia consisting of the Gingko and Snapper mines, a floating heavy mineral concentration plant at the Gingko site, and a mineral separation plant;
- Our Perth Basin operations in Western Australia consisting of the Wonnerup mine and a mineral separation plant; and
- Our Paraiba, Brazil operations consisting of a dredge mine and a mineral separation plant. The Paraiba mine’s life ends in the first half of 2020; however, we believe there is enough feedstock to supply the Brazil pigment plant through 2022.

Zircon is often, but not always, found in mineral sands deposits containing ilmenite. It is extracted, alongside ilmenite and rutile, as part of the initial mineral sands beneficiation process.

The mining of mineral sands deposits is conducted either “wet,” by dredging or hydraulic water jets, or “dry,” by using earth-moving equipment to excavate and transport the sands. The type of mining operation we deploy is dependent upon the characteristics of the ore body. Dredge mining is generally the favored method of mining mineral sands, provided that the ground conditions are suitable, water is readily available and the deposit is low in slime content. Dry mining techniques are generally preferred in situations involving hard ground, discontinuous ore bodies, small tonnage, high slimes contents and/or very high grades.

Regardless of the type of mining technique, the first step in the beneficiation process is to utilize wet concentrator plants to produce a high grade of heavy mineral concentrate (typically approximately 90% to 98% heavy mineral content). Screened ore is first de-slimes, a process by which slimes are separated from larger particles of minerals, and then processed through a series of spiral separators that use gravity to separate the heavy mineral sands from lighter materials, such as quartz. Residue from the concentration process is pumped back into either the open pits or slimes dams for rehabilitation and water recovery.

After producing heavy mineral concentrate in our wet concentrator plants, we separate the non-magnetic (zircon and rutile) and magnetic (ilmenite) fractions utilizing a variety of techniques. Through the separation process, we produce zircon which is sold directly to customers and rutile and leucocene which can immediately be used as feedstock material to make TiO₂ pigment or sold to the titanium metal, welding and other industries.

Ilmenite is generally further refined for use in our chloride-based TiO₂ pigment manufacturing processes. Depending on the characteristics of the ilmenite we use two fundamental processes to refine ilmenite. Both processes involve the removal of iron and other non-titanium material.

- Titanium slag is made by smelting ilmenite in an electric arc furnace to separate titanium-oxide from the iron and other impurities. The result is two products: “slag” which contains 86% to 89% titanium dioxide and is considered a high grade TiO₂ feedstock material, as well as high purity pig iron which is ready for sale to end-use customers.
- Synthetic rutile is made by reducing ilmenite in a rotary kiln, followed by leaching under various conditions to remove the iron from the reduced ilmenite grains. Our synthetic rutile has a titanium dioxide content of approximately 89% to 92% and is also considered a high grade TiO₂ feedstock material.

Our current mining and beneficiation operations have an annual production capacity of approximately 800,000 metric tons (“MT”) of titanium feedstock, which is comprised of 170,000 MT of rutile and leucogene, 220,000 MT of synthetic rutile and 410,000 MT of titanium slag. We currently have the capability to produce approximately 294,000 MT of zircon and 220,000 MT of pig iron.

Competitive Conditions of Mining and Feedstock Production

Globally, there are a large number of mining companies that mine mineral sand deposits containing ilmenite, as well as zircon. However, there is a smaller number of mining companies that are also involved in upgrading the underlying ilmenite to produce the high-grade feedstock typically utilized by TiO₂ producers.

Pigment producers procure a range of types of feedstocks from multiple feedstock producers to create a blend of feedstock materials that maximize the efficiency and economic returns of their unique production technique. Pigment producers frequently switch the relative amount of each feedstock they procure based on a number of factors including: the relative cost of feedstocks, feedstock logistics costs, the cost of, and availability of, chemicals used to process feedstocks, as well as waste management costs. Hence, there is a high degree of substitutability between and among titanium feedstocks.

Production of TiO₂ Pigment

TiO₂ pigment is produced using a combination of processes involving the manufacture of base pigment particles through either the chloride or sulfate process followed by surface treatment, drying and milling (collectively known as finishing). Currently, 87% of our TiO₂ pigment production capacity is produced using the chloride process and 13% of our TiO₂ production capacity is produced using the sulfate process.

In the chloride process, high quality feedstock (slag, synthetic rutile, natural rutile or, in certain cases, high titanium content ilmenite ores) are reacted with chlorine (the chlorination step) and carbon to form TiCl₄ in a continuous fluid bed reactor. Purification of TiCl₄ to remove impurities is accomplished using selective condensation and distillation processes. The purified TiCl₄ is then oxidized in a vapor phase form to produce raw pigment particles and chlorine gas. The latter is recycled back to the chlorination step for reuse. Raw pigment is then typically slurried with water and dispersants prior to entering the finishing step. The chloride process currently accounts for substantially all of the industry-wide TiO₂ production capacity in North America, and approximately 43% of industry-wide capacity globally.

In the sulfate process, ilmenite and/or slag are dissolved in concentrated sulfuric acid. After removing impurities, dissolved titanium is hydrolyzed and separated from the remaining sulfuric acid. The titanium hydrolysate is subsequently calcined in a rotary kiln to produce a raw TiO₂. The product is then further finished in a similar way to TiO₂ produced through the chloride process.

Commercial production of TiO₂ pigment results in one of two different crystal forms: rutile, which is manufactured using either the chloride process or the sulfate process, or anatase, which is only produced using the sulfate process. Rutile TiO₂ is preferred over anatase TiO₂ for many of the largest end-use applications, such as coatings and plastics, because its higher refractive index imparts better hiding power at lower quantities than the anatase crystal form and it is more suitable for outdoor use because it is more durable. Rutile TiO₂ can be produced using either the chloride process or the sulfate process.

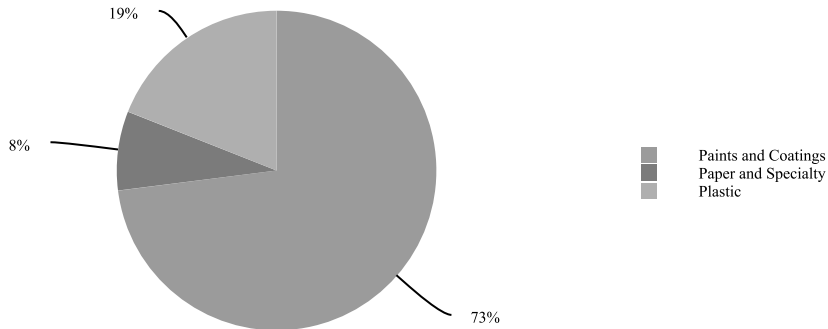
The primary raw materials used in the production of chloride TiO₂ pigment include titanium feedstock, chlorine and coke. As discussed above, we believe we are unique in the degree to which we produce our own

high-grade titanium feedstock. Other chemicals used in the production of TiO₂ are purchased from various companies under short and long-term supply contracts. In the past, we have been, and we expect that we will continue to be, successful in obtaining extensions to these and other existing supply contracts prior to their expiration. We expect the raw materials purchased under these contracts, and contracts that we enter into the near term, to meet our requirements over the next several years.

Marketing of TiO₂

We supply and market TiO₂ under the brand name TRONOX®, TIONA® and CristalActiv® to approximately 1,200 customers in approximately 120 countries, including market leaders in each of the key end-use markets for TiO₂, and we have supplied each of our top ten customers with TiO₂ for more than 10 years. In addition, we continue to work with our customers on implementing margin stability initiatives.

The following sets forth the percentage of our TiO₂ sales volume by end-use market for the year ended December 31, 2019, which includes on a reported basis the sales volume derived from the Cristal business since the Cristal Transaction.



In addition to price and product quality, we compete on the basis of technical support and customer service. Our direct sales, marketing and technical service organizations execute our sales and marketing strategy, and work together to provide quality customer service. Our direct sales staff is trained in all of our products and applications. Due to the technical requirements of TiO₂ applications, our technical service organization and direct sales offices are supported by a regional customer service staff located in each of our major geographic markets.

Our sales and marketing strategy focuses on effective customer management through the development of strong relationships. We develop customer relationships and manage customer contact through our sales team, technical service and marketing organization, research and development team, customer service team, plant operations personnel, supply chain specialists, and senior management visits. We believe that multiple points of customer contact facilitate efficient problem solving, supply chain support, formula optimization and co-development of products.

Competitive Conditions of TiO₂ Pigment

The global market in which our TiO₂ pigment business operates is highly competitive. Competition is based on a number of factors such as price, product quality and service. We face competition from both chloride process pigment producers and sulfate process pigment producers. Moreover, because transportation costs are minor relative to the cost of our product, there is also competition between products produced in one region versus products produced in another region.

We face competition from global competitors with headquarters in Europe, the United States and China, including Chemours, Lomon Billions, Venator, Kronos Worldwide Inc., and INEOS. In addition, we compete with numerous regional producers particularly in Eastern Europe and China.

Research and Development

We have research and development facilities that aim to develop new products, service our products, and focus on applied research and development of both new and existing processes. We utilize a third party for research and development support with respect to our mineral sands business located in South Africa and Australia. The majority of scientists supporting our TiO₂ pigment product development and testing are located in Oklahoma City, Oklahoma, USA and Stallingborough, UK, while the majority of scientists supporting our TiO₂ ultrafine specialty business are located in Thann, France.

New process developments are focused on increased throughput, efficiency gains and general processing-related improvements for our customers. Ongoing development of process technology contributes to cost reduction, enhanced production flexibility, increased capacity, and improved consistency of product quality. In 2019, our product development and commercialization efforts were focused on several TiO₂ products that deliver added value to customers across all end use segments by way of enhanced properties of the pigment.

Patents, Trademarks, Trade Secrets and Other Intellectual Property Rights

Protection of our proprietary intellectual property is important to our business. At December 31, 2019, we held 128 patents and 9 patent applications in the U.S., and approximately 855 in foreign counterparts, including both issued patents and pending patent applications. Our U.S. patents have expiration dates ranging through 2037. Additionally, we have 10 trademark registrations in the U.S. and 1 trademark application in the U.S., as well as 260 trademark counterpart registrations and applications in foreign jurisdictions.

We also rely upon our unpatented proprietary technology, know-how and other trade secrets. The substantial majority of our patents and trade secrets relate to our chloride products, surface treatments, chlorination expertise, and oxidation process technology, and this proprietary chloride production technology is an important part of our overall technology position. However, much of the fundamental intellectual property associated with both chloride and sulfate pigment production is no longer subject to patent protection. At Namakwa Sands, we rely on intellectual property for our smelting technology, which was granted to us in perpetuity by Anglo American South Africa Limited for use on a worldwide basis, pursuant to a non-exclusive license.

While certain of our patents relating to our products and production processes are important to our long-term success, more important is the operational knowledge we possess. We also use and rely upon unpatented proprietary knowledge, continuing technological innovation and other trade secrets to develop and maintain our competitive position. We conduct research activities and protect the confidentiality of our trade secrets through reasonable measures, including confidentiality agreements and security procedures. We protect the trademarks that we use in connection with the products we manufacture and sell, and have developed value in connection with our long-term use of our trademarks. See “Risk Factors—Third parties may develop new intellectual property rights for processes and/or products that we would want to use, but would be unable to do so; or, third parties may claim that the products we make or the processes that we use infringe their intellectual property rights, which may cause us to pay unexpected litigation costs or damages or prevent us from making, using or selling products we make or require alteration of the processes we use.”

Employees

As of December 31, 2019, we had approximately 6,660 employees worldwide, of which approximately 705 are located in North America, 494 in South America, 1,131 in Australia, 1,990 in South Africa, 664 in KSA, 922 in Europe and 754 in the Asia-Pacific region. We consider relations with our employees and labor organizations to be good.

Environmental, Health and Safety Authorizations

Mining

Our facilities and operations are subject to extensive general and industry-specific environmental, health and safety regulations in South Africa and Australia. These regulations include those relating to mine rehabilitation, liability provision, water management, the handling and disposal of hazardous and non-hazardous materials, and occupational health and safety. The various legislation and regulations are subject to a number of internal and external audits. We believe our mineral sands operations are in compliance, in all material respects, with existing health, safety and environmental legislation and regulations.

Regulation of the Mining Industry in South Africa

The South African mining regulatory regime is comprehensive and requires regular reporting to applicable government departments. A failure to, among other things, comply with any such reporting requirements or the conditions of any mining license could result in extended mandatory shutdown periods, license and/or mining right suspensions or revocations all of which could impact our business.

In South Africa, the primary legislative enactments with which our mines are required to comply are the Mineral and Petroleum Resources Development Act (“MPRDA”) which governs the acquisition and retention of prospecting and mining rights. In addition, the Mine Health and Safety Act governs the manner in which mining must be conducted from a health and safety perspective, while the National Environmental Management Act (and its subsidiary legislation) provides the underlying framework with respect to environmental rules and regulation for which our operations must comply. For additional details regarding other South African legislative enactments that govern our mining licenses please see the section entitled “Risk Factors” set forth elsewhere in this Form 10-K.

Regulation of the Mining Industry in Australia

Mining operations in Western Australia are subject to a variety of environmental protection regulations including but not limited to: the Environmental Protection Act (the “EPA”), the primary source of environmental regulation in Western Australia, and, the Environment Protection and Biodiversity Conservation Act 1999 (Cth), which established the federal environment protection regime and prohibits the carrying out of a “controlled action” that may have a significant impact on a “matter of national environmental significance.”

Prescriptive legislation regulates health and safety at mining workplaces in Western Australia. The principal general occupational health and safety legislation and regulations are the Occupational Safety and Health Act 1984 (WA), the Occupational Health and Safety Regulations 1996 (WA) and the related guidelines. The Mines Safety and Inspection Act 1994 (WA) and Mines Safety and Inspection Regulations 1995 (WA) and related guidelines provide the relevant legislation for mining operations in Western Australia. The Dangerous Goods Act 2004 (WA) applies to the safe storage, handling and transport of dangerous goods.

Each Australian state and territory has its own legislation regulating the exploration for and mining of minerals. Our exploration and mining operations are regulated by the Western Australian Mining Act 1978 (WA) and the Mining Regulations 1981 (WA).

In Western Australia, State Agreements are contracts between the State and the proponents of major resources projects within Western Australia, and are intended to foster resource development and related infrastructure investments. These agreements are approved and ratified by the Parliament of Western Australia. The State Agreement relevant to our Australian operations and our production of mineral sands is the agreement authorized by the Mineral Sands (Cooljarloo) Mining and Processing Agreement Act 1988 (WA). State Agreements supplement the legislation and regulations referred to above, and can often have the effect of varying the way in which such legislation or regulations apply to (and generally, are for the benefit of) a specific project. State Agreements may only be amended by mutual consent, which can (among other things) serve to reduce sovereign risk and enhance security of tenure, however Parliament may enact legislation that overrules or amends the particular State Agreement (although this would not typically occur without prior engagement with the project proponent).

Regulation of Finished Product Manufacturing

Our business is subject to extensive regulation by federal, state, local and foreign governments. Governmental authorities regulate the generation and treatment of waste and air emissions at our operations and facilities. At many of our operations, we also comply with worldwide, voluntary standards developed by the International Organization for Standardization (“ISO”), a nongovernmental organization that promotes the development of standards and serves as a bridging organization for quality and environmental standards, such as ISO 9002 for quality management and ISO 14001 for environmental management.

Chemical Registration

As a chemical manufacturer with global operations, we are subject to a wide array of regulations regarding the import, export, labelling, use, storage and disposal of our products. We are obliged to comply with the regulation of chemical substances and inventories under the Toxic Substances Control Act in the United States and the Registration, Evaluation and Authorization of Chemicals (“REACH”) regulation in Europe, as well as a growing list of analogous regimes in other parts of the world, including China, South Korea and Taiwan. Manufacturers and importers of chemical substances must register information regarding the properties of their existing chemical substances with the European Chemicals Agency (“ECHA”). REACH regulations also require chemical substances, which are newly imported or manufactured in the EU to be registered before being placed

on the market. In addition, REACH requires registrants to update registrations within specified timelines, as well as when there may be new information relevant to human health or environmental risks of the substance. In addition, REACH includes a mechanism to evaluate substances to determine if it poses risk to human health and/or the environment. In May 2016, France's competent authority under REACH submitted a proposal to ECHA that would classify TiO₂ pigment as carcinogenic in humans by inhalation. In February 2020, the European Commission adopted a regulation classifying the powder form of TiO₂ as a Category 2 Carcinogen by inhalation. The labelling regulation will come into effect 18 months after adoption, approximately in June 2021. For additional information on this topic, see section entitled "Risk Factors - Risks Relating to our Business - The classification of TiO₂ as a Category 2 Carcinogen in the European Union could result in more stringent regulatory control with respect to TiO₂."

Greenhouse Gas Regulation

Globally, our operations are subject to regulations that seek to reduce emissions of "greenhouse gases" ("GHGs"). We currently report and manage GHG emissions as required by law for sites located in areas requiring such managing and reporting (EU/Australia). While the U.S. has not adopted any federal climate change legislation, the U.S. Environmental Protection Agency ("EPA") has introduced some GHG programs. For example, under the EPA's GHG "Tailoring Rule," expansions or new construction could be subject to the Clean Air Act's Prevention of Significant Deterioration requirements. Some of our facilities are currently subject to GHG emissions monitoring and reporting. Changes or additional requirements due to GHG regulations could impact our capital and operating costs; however, it is not possible at the present time to estimate any financial impact any such changes or additional requirements may have to our operating sites.

Available Information

Our public internet site is <http://www.tronox.com>. The content of our internet site is available for information purposes only and is included as an inactive textual reference. It should not be relied upon for investment purposes, nor is it incorporated by reference into this annual report unless expressly noted. We make available, free of charge, on or through the investor relations section of our internet site, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, proxy statements and Forms 3, 4 and 5 filed on behalf of directors and executive officers, as well as any amendments to those reports filed or furnished pursuant to the U.S. Securities and Exchange Act of 1934, as amended (the "Exchange Act") as soon as reasonably practicable after we electronically file such material with, or furnish it to, the U.S. Securities and Exchange Commission (the "SEC").

We file current, annual and quarterly reports, proxy statements and other information required by the Exchange Act with the SEC. Our SEC filings are also available to the public from the SEC's internet site at <http://www.sec.gov>.

Item 1A. Risk Factors

You should carefully consider the risk factors set forth below, as well as the other information contained in this Form 10-K, including our consolidated financial statements and related notes. This Form 10-K contains forward-looking statements that involve risks and uncertainties. Any of the following risks could materially and adversely affect our business, financial condition or results of operations. Additional risks and uncertainties not currently known to us or those we currently view to be immaterial may also materially and adversely affect our business, financial condition or results of operations. The following risk factors are not necessarily presented in order of relative importance and should not be considered to represent a complete set of all potential risks that could affect our business, financial condition or results of operations.

RISKS RELATING TO OUR BUSINESS

Market conditions, as well as global and regional economic downturns that adversely affect the demand for our end-use products, could adversely affect the results of our operations and the prices at which we can sell our products, thus, negatively impacting our financial results.

Our revenue and results of operations are significantly dependent on sales of TiO₂ products and zircon. Demand for these products historically have been linked to global, regional and local GDP and discretionary spending, which can be negatively impacted by regional and world events or economic and market conditions. Such events can cause a decrease in demand for our products and market prices to fall, which may have an adverse effect on our results of operations and financial condition. A substantial portion of our products and raw materials are commodities that reprice as market supply and demand fundamentals change. Accordingly, product margins and the results of operations tend to vary with changes in the business cycle.

A significant portion of the demand for our TiO₂ products comes from manufacturers of paint and plastics. A significant portion of the demand for zircon comes from industrial customers particularly those that serve the construction industry. Our customers may experience significant fluctuations in demand for their own end products because of economic conditions, changes in consumer demand, or increases in raw material and energy costs. In addition, with respect to the zircon market, we believe that China currently accounts for approximately 50% of the world's demand for zircon. As such, any prolonged downturn in China, including, among other things, due to the coronavirus, with respect to the demand for zircon could have a material adverse effect on our business and financial results.

The price of our products, in particular, TiO₂, zircon, and feedstock/other products, have been, and in the future may be, volatile. Price declines for our products will negatively affect our financial position and results of operations.

Historically, the global market for TiO₂ and zircon have been volatile, and those markets are likely to remain volatile in the future. Prices for TiO₂ and zircon may fluctuate in response to relatively minor changes in the supply of, and demand for, these products, market uncertainty and other factors beyond our control. Factors that affect the price of our products include, among other things:

- overall economic conditions;
- the level of customer demand particularly in the paint, plastics and construction industries;
- the level of production and exports of our products globally;
- the level of production and cost of materials used to produce our products;
- the cost of energy consumed in the production of TiO₂ and zircon, including the price of natural gas, electricity and coal;
- the impact of competitors increasing their capacity and exports;
- domestic and foreign governmental relations, tariffs or other trade disputes, regulations and taxes; and
- political conditions or hostilities and unrest in regions where we export our TiO₂, zircon and feedstock/other products.

Pricing pressure with respect to our TiO₂ products and zircon can make it difficult to predict the cash we may have on hand at any given time, and a prolonged period of price declines may materially and adversely affect our financial position, liquidity, ability to finance planned capital expenditures and results of operations.

Our industry and the end-use markets in which we compete are highly competitive. This competition may adversely affect our results of operations and operating cash flows.

Each of our markets is highly competitive. Competition in the TiO₂ industry is based on a number of factors such as price, product quality, and service. We face significant competition from major international and smaller regional competitors, including producers in China. Moreover, Chinese producers have significantly expanded their production capacity in recent years and have also commenced the commercial production of TiO₂ via chloride technology. The risk of substitution of these Chinese producers by our customers could increase as these Chinese producers expand their use of chloride technology and continue to improve the quality of their sulfate products.

Moreover, we compete with a large number of mining companies with respect to zircon. Zircon producers generally compete on the basis of price, quality, logistics, delivery, and payment terms and consistency of supply.

Within the end-use markets in which we compete, competition between products is intense. We face substantial risk that our customers could switch to our competitors' products in response to any number of developments including new product development by competitors, changing customer needs, increased commercial production of TiO₂ via chloride technology, greater acceptance of TiO₂ via sulfate technology in end-market applications previously characterized by TiO₂ via chloride technology, production advances for competing products, price changes in raw materials, or, with respect to zircon customers, switching to lower priced substitute products. Our inability to develop, produce or market our products to compete effectively against our competitors could have a material adverse effect on our business, financial condition, results of operations and cash flow.

An increase in the price of energy or other raw materials, or an interruption in our energy or other raw material supply, could have a material adverse effect on our business, financial condition or results of operations.

Our mining, beneficiation, smelting and production processes consume significant amounts of energy and raw materials, the costs of which can be subject to worldwide, as well as, local supply and demand, as well as other factors beyond our control. In 2019, ore, process chemicals and energy used in the production of TiO₂ constituted approximately 33 %, 16% and 9%, respectively, of our operating expenses. Fuel and energy linked to commodities, such as diesel, heavy fuel oil and coal, and other consumables, such as chlorine, illuminating paraffin, electrodes, and anthracite, consumed in our TiO₂ manufacturing and mining operations form an important part of our TiO₂ operating costs. We have no control over the costs of these consumables, many of which are linked to some degree to the price of oil and coal, and the costs of many of these raw materials may fluctuate widely for a variety of reasons, including changes in availability, major capacity additions or reductions, or significant facility operating problems. These fluctuations could negatively affect our operating margins, our results of operations or planned capital expenditures. As these costs rise, our operating expenses will increase and could adversely affect our business, especially if we are unable to pass price increases in raw materials through to our customers.

The markets for many of our products have seasonally affected sales patterns.

The demand for our products is subject to seasonal fluctuations. TiO₂ is widely used in paint and other coatings where demand increases prior to the painting season in the Northern Hemisphere (spring and summer). Additionally, although zircon is generally a non-seasonal product, it is negatively impacted by the winter and Chinese New Year celebrations due to reduced zircon demand from China. We may be adversely affected by existing or future cyclical changes, and such conditions may be sustained or further aggravated by anticipated or unanticipated changes in regional weather conditions. For example, poor weather conditions in a region can lead to an abbreviated painting season, which can depress consumer sales of paint products that use TiO₂.

Concentrated ownership of our ordinary shares by Cristal and Exxaro may prevent minority shareholders from influencing significant corporate decisions and may result in conflicts of interest.

As of December 31, 2019, Cristal Inorganic, an affiliate of Cristal, and Exxaro own approximately 26% and 10%, respectively, of our outstanding ordinary shares. As such, Cristal Inorganic and Exxaro may be able to influence fundamental corporate matters and transactions. This concentration of ownership, may delay, deter or prevent acts that would be favored by our other shareholders. The interests of Cristal Inorganic and Exxaro may

not always coincide with our interests or the interests of our other shareholders. Also, Cristal Inorganic and Exxaro may seek to cause us to take courses of action that, in their judgment, could enhance their investment in us, but which might involve risks to our other shareholders or adversely affect us or our other shareholders.

In addition, under the shareholders agreement (the “Cristal Shareholders Agreement”) we entered into at the closing of the Cristal Transaction with Cristal, as long as Cristal Inorganic and the three shareholders of Cristal (collectively, the “Cristal Shareholders”) collectively beneficially own at least 24,900,000 or more of our ordinary shares, they have the right to designate for nomination two directors of our board of directors (the “Board”). As long as the Cristal Shareholders collectively beneficially own at least 12,450,000 ordinary shares but less than 24,900,000 ordinary shares, they have the right to designate for nomination one director of the Board. The Cristal Shareholders Agreement also provides that as long as the Cristal Shareholders collectively beneficially own at least 12,450,000 ordinary shares they have certain preemptive rights. Also under the Cristal Shareholders Agreement, upon written notice from Cristal, we have agreed to file a registration statement covering 6,532,738 shares which may be sold as soon as such registration statement is effective. Other than with respect to those shares, the Cristal Shareholders Agreement includes restrictions on Cristal Inorganic’s ability to transfer any of its ordinary shares (a) prior to April 10, 2021 other than to certain permitted transferees after the later of (i) eighteen months from the close of the Cristal Transaction, and (ii) the resolution of all indemnification claims under the transaction agreement, and (b) prior to December 31, 2022, if such transfer would cause an “ownership change” as defined under Section 382 of the Internal Revenue Code (the “Code”). The Cristal Shareholders Agreement also contains certain demand and piggyback registration rights, which, other than with respect to the 6,532,738 shares, commence after the transfer restriction period expires.

As a result of these or other factors, including as a result of any offering of shares by Cristal or Exxaro, or the perception that such sales may occur, the market price of our ordinary shares could decline. In addition, this concentration of share ownership may adversely affect the trading price of our ordinary shares because investors may perceive disadvantages in owning shares in a company with significant shareholders or with significant outstanding shares with registration rights.

Our South African mining rights are subject to onerous regulatory requirements imposed by legislation and the Department of Mineral Resources (the “DMR”), the compliance of which could have a material adverse effect on our business, financial condition and results of operations.

Black economic empowerment (“BEE”) legislation was introduced into South Africa as a means to seek to redress the inequalities of the previous apartheid system by requiring the inclusion of historically disadvantaged South Africans in the mainstream economy. Under BEE legislation, South African businesses are required to become “empowered” and in the mining sector comply with a distinct “sector charter.” As of March 1, 2019, South African mining companies, such as ours, are required to comply with Mining Charter III which was first promulgated by the DMR in September, 2018. While Mining Charter II previously required a 26% ownership by a BEE empowered entity, new Mining Charter III requires a 30% BEE shareholding that must be structured through a special purpose vehicle comprised of black entrepreneurs, the local community surrounding the relevant mining area and eligible employees. In addition, Mining Charter III sets forth new requirements with regard to the procurement of goods and services from BEE compliant entities; race, age and gender based ownership criteria and employment quotas; and workers’ housing and living conditions. While we believe we are currently in compliance with the provisions of Mining Charter III, the implementation guidelines promulgated in December 2018 are complex and remain untested. As a result, the manner in which Mining Charter III is enforced by the DMR may have a material adverse effect on our business, financial condition or results of operations.

By virtue of the fact that prior to 2017 Exxaro was greater than 50% owned by historically disadvantaged South Africans and that it continued to hold a 26% ownership interest in our two South African operating entities, for purposes of our existing mining rights Exxaro had historically enabled us to comply with the BEE requirements of Mining Charter II, the predecessor sector charter to Mining Charter III. We believe that under Mining Charter III the “once empowered always empowered” principle applies to our existing mining rights. Hence, for the duration of our current mining rights we can comply with all relevant BEE requirements regardless of Exxaro’s ownership in our two South African operating entities. However, Mining Charter III requires that applications for renewals of existing mining rights or any new mining rights that we may desire to acquire in the future will require 30% historically disadvantaged South African ownership in the ratios set out in Mining Charter III.

“Once empowered always empowered” means that a South African company that has had the requisite shareholding base consisting of historically disadvantaged South Africans as at December 31, 2014 will always qualify as an “empowered” entity for purposes of the retention of an existing mining right for the duration of that right. The question of whether the “once empowered always empowered” principle applies in the mining industry in South Africa has been subject to litigation between the Minerals Council of South Africa (the “Minerals Council”) (formerly the Chamber of Mines, an industry body that represents approximately 90% of the South African Mining Industry) and the DMR. Although the South African High Court decided in the affirmative for the Minerals Council, the DMR has appealed the High Court ruling and the outcome remains pending. It is our opinion that the “once empowered always empowered” is applicable to our existing mining rights, but not in respect of applications for renewals of existing mining rights or applications for new mining rights made under the Mining Charter III. If DMR were to challenge our compliance with Mining Charter III or “once empowered always empowered” is otherwise not fully recognized, our business, financial condition or results of operation could be adversely affected.

We may elect to exercise certain “flip in” rights to buy-out Exxaro’s 26% ownership rights in our South African subsidiaries which might negatively impact the ownership of our heavy mineral sands mining rights.

In connection with the 2012 transaction with Exxaro, Exxaro was granted a “flip in” right such that following the occurrence of certain events, Exxaro would be entitled to exchange its 26% shareholding in our South African operating subsidiaries which hold our mining licenses for an additional 7.2 million ordinary shares. On November 26, 2018, we, certain of our subsidiaries and Exxaro entered into the Exxaro Mineral Sands Transaction Completion Agreement (the “Completion Agreement”) which amends the “flip-in” rights granted to Exxaro so that we may, subject to certain conditions, accelerate the occurrence of the “flip in.” If we elect to accelerate the “flip in” there can be no assurance that the DMR will not challenge our right to continue to operate our mineral sands mining operations based upon the failure of our South African subsidiaries to comply with all applicable BEE requirements. If DMR’s challenge is successful, our existing mining rights could be suspended or revoked which would have a material adverse effect on our business, financial conditions or results of operations.

We may not be able to realize anticipated benefits of the Cristal Transaction, including expected synergies, earnings per share accretion or EBITDA and free cash flow growth.

The success of the Cristal Transaction will depend, in part, on our ability to realize anticipated cost synergies, earnings per share accretion or EBITDA and free cash flow growth. Our success in realizing these benefits, and the timing of this realization, depends on the successful integration of our business and operations with the acquired Cristal business and operations. Even if we are able to integrate the acquired Cristal businesses and operations successfully, including the achievement of Cristal Transaction-related synergies that meet or exceed our current expectations, this integration may not result in the realization of the full benefits of the Cristal Transaction that we currently expect within the anticipated time frame or at all. There is also the possibility that:

- we may fail to realize expected performance optimization, including increased volume production;
- the acquisition may result in our assuming unexpected liabilities;
- we may experience difficulties integrating operations and systems, as well as company policies, cultures and best practices;
- we may fail to retain and assimilate employees of the acquired business;
- problems may arise in entering new markets in which we have little or no experience; and
- our post-acquisition revenue projections may be less than anticipated due to loss of customers, price volatility or reduced demand for the combined company’s products.

Prior to the consummation of the Cristal Transaction, Cristal was not a publicly reporting company and if we fail to successfully integrate it into our internal control over financial reporting, or if Cristal’s internal controls are found to be ineffective, the integrity of our financial reporting could be compromised and we could experience a material adverse effect on our business, financial condition, results of operations and cash flow.

Prior to the Cristal Transaction, Cristal was a private company that was not subject to U.S. financial reporting requirements. Now that we have completed the Cristal Transaction, the Cristal business has become

subject to the rules and regulations established from time to time by the SEC and the NYSE. In addition, as a public company, we are required to document and test our internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act of 2002 so that our management can certify as to the effectiveness of our internal controls over financial reporting, which, by the time our second annual report is filed with the SEC following the consummation of the Cristal Transaction, would include the acquired Cristal business. Bringing Cristal into compliance with these rules and regulations and integrating Cristal into our current compliance and accounting system may require us to make and document significant changes to Cristal's internal controls over financial reporting, increase our legal and financial compliance costs, make some activities more difficult, time-consuming or costly and increase demand on our systems and resources. Furthermore, the need to establish the necessary corporate infrastructure to integrate Cristal may divert management's attention from implementing our growth strategy, which could prevent us from improving our business, financial condition and results of operations. Although we have begun integrating the Cristal business into our existing compliance and accounting processes, as well as begun implementing internal controls within the Cristal business that align with our existing controls, there can be no assurance that such efforts will be successful or that our internal control over financial reporting will be effective as a result of such efforts. In addition, there can be no assurance that we will not identify material weaknesses in our internal control over financial reporting in the future or that any such weaknesses will not have a material impact on our operating results or financial statements or cause us to fail to meet our reporting obligations. If we discover a material weakness in our internal controls in the future, the disclosure of that fact could reduce the market's confidence in our financial statements and the market price of our securities may decline. These additional obligations or events could have a material adverse effect on our business, financial condition, results of operations and cash flow.

Following the Cristal Transaction, our future results could suffer if we do not effectively manage our expanded business, operations and employee base.

As a result of the Cristal Transaction, we more than doubled the size of our business, operations and employee base. Our future success depends, in part, upon our ability to manage this expanded business, operations and employee base, which will pose substantial challenges for management, including challenges related to the management and monitoring of new operations and associated increased costs and complexity. We may not be able to successfully manage the combined company's expanded business, operations and employee base.

We are exposed to the risks of operating a global business.

As a result of the Cristal Transaction, we now have operations in new jurisdictions around the globe, including Brazil, China and the Kingdom of Saudi Arabia ("KSA"), which subject us to a number of risks, including:

- adapting to unfamiliar regional and geopolitical conditions and demands, including political instability, civil unrest, expropriation, nationalization of properties by a government, imposition of sanctions, changes to import or export regulations and fees, renegotiation or nullification of existing agreements, mining leases and permits;
- increased difficulties with regard to political and social attitudes, laws, rules, regulations and policies within countries that favor domestic companies over non-domestic companies, including customer- or government-supported efforts to promote the development and growth of local competitors;
- economic and commercial instability risks, including those caused by sovereign and private debt default, corruption, and new and unfamiliar laws and regulations at national, regional and local levels, including taxation regimes, tariffs and trade barriers, exchange controls, repatriation of earnings, and labor and environmental and health and safety laws and regulations;
- implementation of additional technological and cybersecurity measures and cost reduction efforts, including restructuring activities, which may adversely affect our ability to capitalize on opportunities;
- major public health issues which could cause disruptions in our operations or workforce;
- war or terrorist activities;
- difficulties enforcing intellectual property and contractual rights in certain jurisdictions; and
- unexpected events, including fires or explosions at facilities, and natural disasters.

With respect to major public health issues, in December 2019, a novel strain of coronavirus was reported to have surfaced in Wuhan, China. In early 2020, China began reporting on the spread of the coronavirus and thousands of cases of the disease have since been identified throughout the rest of Asia, as well as in Europe, the U.S., Latin America and other regions that are important to our business in terms of sales, manufacturing and other aspects of our supply chain. The coronavirus may impact the global economy, our ability, as well as the ability of our customers and suppliers, to manufacture products and may reduce demand in our markets which could have a material adverse effect result on our business, financial condition or results of operations. The extent to which the coronavirus impacts our results, particularly with respect to our TiO₂ production plants and mineral sands operations and the supply of our TiO₂ and zircon products to our global customers, will depend on future developments, which are highly uncertain and cannot be predicted, including new information which may emerge concerning the severity of the coronavirus and the actions to contain the coronavirus or treat its impact, among others.

Political and social instability, and unrest, and actual, or potential, armed conflicts in the Middle East region may affect the Company's results of operations and financial position.

Our operations in KSA may be affected by the political, social and economic conditions from time to time prevailing in, or affecting, KSA or the wider Middle East region. For example, since 2011, a number of countries in the Middle East region have witnessed significant social unrest, including widespread public demonstrations, and, in certain cases, armed conflict, terrorist attacks, diplomatic disputes, foreign military intervention and a change of government. Armed conflict is currently ongoing in Yemen, Iraq, Syria and Libya. In addition, KSA faces a number of challenges arising mainly from the relatively high levels of unemployment among the Saudi youth population, requests for political and social changes, and the security threat posed by certain groups. Should KSA experience similar political and social unrest as found in other countries in the Middle East, the Saudi Arabian economy could be adversely affected, our TiO₂ plant located in Yanbu could be temporarily disrupted or materially adversely affected and our business and operating results could be materially adversely affected.

In addition, one of our TiO₂ pigment plants is located in Yanbu, and the Slagger, that is subject to the Option or Put, is located in Jazan. Yanbu and Jazan have both been subject to rocket attacks from armed rebel groups fighting the KSA military in Yemen which could materially adversely affect our business and operating results.

South Africa, where we have large mining assets and derive a significant portion of our revenue and profit, poses distinct operational risks which could affect our business, financial condition and results of operations.

In South Africa, we currently operate two significant mining assets, as well as accompanying separation plants and smelting operations, and derive a significant portion of our profit from the sale of zircon. Our mining and smelting operations depend on electrical power generated by Eskom, the sole, state-owned energy supplier. Eskom has not been able to reliably provide electrical power and as a result "load-shedding" (planned and unplanned rolling power outages) is expected for the foreseeable future. In addition, South African electricity prices have risen during the past few years, and future prices increases are expected to occur. As such, restrictions or additional conditions imposed by Eskom such as load shedding, electricity restrictions and/or electricity price increases could have a material adverse effect on our business, financial conditions or results of operations.

In addition, our KZN Sands operations currently use approximately 356,000 gigajoules of Sasol gas, which is available only from Sasol Limited. As such, an interruption in the supply of Sasol gas could have a material adverse effect on our business, financial conditions or results of operations.

Moreover, certain regions of South Africa have experienced in the past, and are prone to, drought conditions resulting in water restrictions being imposed in such areas. We use significant amounts of water in our South African operations. A prolonged drought in a region of South Africa where our operations are located may lead to water use restrictions which could have a material adverse effect on our business, financial condition or results of operations. In addition, under South African law, our South African mining operations are subject to water-use licenses that govern each operation. These licenses require, among other conditions, that mining operations achieve and maintain certain water quality limits for all water discharges, where applicable. Changes to water-use licenses could increase our costs of operations thereby affecting our operational results and financial condition.

Our operations in South Africa are also reliant on services provided by the State-owned, sole provider of rail transport, Transnet. Furthermore, Transnet provides extensive dockside services at both the ports of Richards Bay and Saldanha Bay via Transnet Port Authority. Delays or interruptions at either the rail service or the ports in which we receive and/or export material could have a negative impact on our business, financial condition and results of operations.

The aforementioned operational risks, as well as any other foreseen or unforeseen operational risks primarily related to doing business in South Africa, could have a material adverse effect on our business, financial condition or results of operations.

As an emerging market, South Africa poses a challenging array of long-term political and economic risks.

South Africa continues to undergo political and economic challenges. Changes to, or instability in, the economic or political environment in South Africa, especially if such changes create political instability, actual or potential shortages of production materials or labor unrest, could result in production delays and production shortfalls, and materially impact our production and results of operations.

The South African government has recently embarked on a process of identifying and securing land for persons who were previously dispossessed of such land as a result of Apartheid policies. In December 2019, the South African government released a draft land expropriation bill for public comment. The land expropriation bill contemplates that, where it is in the “public interest”, land may be expropriated by the South African government, without compensation being payable to the current owners. While the South African government has indicated that such measures will be applied initially to state-owned land, it is possible that such measures may extend to agricultural and mining areas. We own the majority of the land on which the Namakwa Sands and KZN Sands operations are situated and have invested considerable funds in developing these areas. In the event that these areas become the subject of a land claim under any such proposed or future land expropriation bill, it may have a material adverse effect on our business, financial condition or results of operations.

In addition, South Africa’s exchange control regulations require resident companies to obtain the prior approval of the South African Reserve Bank to raise capital in any currency other than the Rand, and restrict the export of capital from South Africa. While the South African government has relaxed exchange controls in recent years, it is difficult to predict whether or how it will further change or abolish exchange control measures in the future. These exchange control restrictions could hinder our financial and strategic flexibility, particularly our ability to use South African capital to fund acquisitions, capital expenditures, and new projects outside of South Africa.

Moreover, our operations have been affected by inflation in South Africa in recent years. Employment costs and wages in South Africa have increased in recent years, resulting in significant cost pressures for the mining industry. Prolonged or heightened inflation and associated cost pressures could have a material adverse effect on our business, financial condition or results of operations.

In addition, our South African operations have entered into various collective agreements with organized labor regulating wages and working conditions at our mines and smelter operations. There have been periods when various stakeholders have been unable to agree on dispute resolution processes, leading to threats of disruptive industrial action disputes. Due to the high level of employee union membership, our South African operations are at risk of production stoppages for indefinite periods due to strikes and other labor disputes. Although we believe that we have good labor relations with our South African employees, we may experience labor disputes in the future.

As part of our community social investment initiative, our South African operations are actively seeking to empower and partner with our local communities in order to develop vendor potential and opportunities. While we have had a number of successes in these partnerships, there have been threats of violence if community expectations regarding the procurement of goods and services are not met. Any such violence or upheaval could result in production stoppages for indefinite periods of time.

Although we believe that our relationships with our various local communities are good, the areas in which our South African operations are situated are the traditional homelands of various tribal groupings that are historically politically volatile. This volatility persists today and frequently results in violent, destructive

behaviors. Increased volatility and any consequential civil unrest may result in production stoppages and/or the destruction of assets which comprise our South African operations, any of which could have a material adverse effect on our business, financial condition or results of operations.

South African employment law, which is based on the minimum standard set by the International Labor Organization, sets out minimum terms and conditions of employment for employees. Although these may be improved by agreements between an employer and the trade unions, prescribed minimum terms and conditions form the benchmark for all employment contracts. Our South African operations are required to submit a report to the South African Department of Labor under South African employment law detailing the progress made towards achieving employment equity in the workplace. Failing to submit this report in a timely manner could result in substantial penalties. In addition, future legislative developments that affect South African employment policies may increase production costs or negatively impact relationships with employees and trade unions, which may have an adverse effect on our business, operating results and financial condition.

Our ability to use our tax attributes to offset future income may be limited.

Our ability to use any net operating losses (“NOLs”) and Section 163(j) interest expense carryforwards (which are now subject to limitations under Section 382 of the Code per the U.S. tax reform bill enacted on December 22, 2017 (the “Tax Reform Act”) generated by us could be substantially limited if we were to experience an “ownership change” as defined under Section 382 of the Code. In general, an “ownership change” would occur if our “5-percent shareholders,” as defined under Section 382 of the Code, including certain groups of persons treated as “5-percent shareholders,” collectively increased their ownership in us by more than 50 percentage points over a rolling three-year period. Pursuant to the Completion Agreement, Exxaro has agreed to sell down its remaining ownership interest in us in a manner that we believe will not cause us to lose, under limitations set forth in Section 382 of the Code, the benefit of approximately \$4.1 billion of NOLs and/or the approximately \$1.1 billion of Section 163(j) interest expense carryforwards. Although we believe the Completion Agreement and Re-domicile Transaction should provide sufficient protection of our NOLs and/or Section 163(j) interest expense carryforwards, there can be no assurance that an “ownership change” for U.S. federal and applicable state income tax purposes will not occur in the future. A corporation that experiences an ownership change will generally be subject to an annual limitation on the use of its pre-ownership change NOLs (and certain other losses and/or credits) equal to the equity value of the corporation immediately before the ownership change, multiplied by the long-term tax-exempt rate for the month in which the ownership change occurs. Although our NOLs continue to have full valuation allowances, such a limitation could, for any given year, have the effect of increasing the amount of our U.S. federal income tax liability, which would negatively impact our financial condition and the amount of after-tax cash available for distribution to holders of our ordinary shares if declared by our board of directors.

We are a holding company that is dependent on cash flows from our operating subsidiaries to fund our debt obligations, capital expenditures and ongoing operations.

All of our operations are conducted, and all of our assets are owned, by our operating companies, which are our subsidiaries. We intend to continue to conduct our operations at the operating companies and any future subsidiaries. Consequently, our cash flow and our ability to meet our obligations or make cash distributions depends upon the cash flow of our operating companies and any future subsidiaries, and the payment of funds by our operating companies and any future subsidiaries in the form of dividends or otherwise. The ability of our operating companies and any future subsidiaries to make any payments to us depends on their earnings, the terms of their indebtedness, including the terms of any credit facilities, or indentures, and legal restrictions regarding the transfer of funds.

Our ability to service our debt and fund our planned capital expenditures and ongoing operations will depend on our ability to generate and increase cash flow, and our access to additional liquidity sources. Our ability to generate and increase cash flow is dependent on many factors, including:

- the transfer of funds from subsidiaries in the U.S. to certain foreign subsidiaries;
- our ability to obtain raw materials at reasonable prices or to raise prices to offset, in whole or in part, the effects of higher raw material costs;
- the selling price of our products;

- our ability to adequately deliver customer service and competitive product quality;
- the impact of competition from other chemical and materials manufacturers and diversified companies;
- general world business conditions, economic uncertainty or downturn and the significant downturn in housing construction and overall economies;
- the effects of governmental regulation on our business;
- tariff, trade duties and other trade barriers; and
- political and social instability.

Many of these factors are beyond our control. A general economic downturn can result in reduced spending by customers, which will impact our revenues and cash flows from operating activities. At reduced performance, if we are unable to generate sufficient cash flow or access additional liquidity sources, we may not be able to service and repay our existing debt, operate our business, respond to competitive challenges, or fund our other liquidity and capital needs.

The agreements and instruments governing our debt contain restrictions and limitations that could affect our ability to operate our business, as well as impact our liquidity.

As of December 31, 2019, our total principal amount of debt was approximately \$3.0 billion. Our credit facilities contain covenants that could adversely affect our ability to operate our business, our liquidity, and our results of operations. These covenants restrict, among other things, our and our subsidiaries' ability to:

- incur or guarantee additional indebtedness;
- complete asset sales, acquisitions or mergers;
- make investments and capital expenditures;
- prepay other indebtedness;
- enter into transactions with affiliates; and
- fund additional dividends or repurchase shares.

Certain of our indebtedness facilities and senior notes include requirements relating to the ratio of adjusted EBITDA to indebtedness or certain fixed charges. The breach of any covenants or obligations in our credit facilities, not otherwise waived or amended, could result in a default under the applicable debt obligations (and cross-defaults to certain other debt obligations) and could trigger acceleration of those obligations, which in turn could trigger other cross defaults under other existing or future agreements governing our long-term indebtedness. In addition, the secured lenders under the credit facilities could foreclose on their collateral, which includes equity interests in our subsidiaries, and exercise other rights of secured creditors. Any default under those credit facilities could adversely affect our growth, our financial condition, our results of operations and our ability to make payments on our credit facilities, and could force us to seek the protection of bankruptcy laws.

Additionally, the interest rates on our existing Term Loan Facility (as defined elsewhere in this Form 10-K) is tied to LIBOR. In July 2017, the head of the United Kingdom's Financial Conduct Authority announced its intention to phase out the use of LIBOR by the end of 2021. The uncertainty regarding the future of LIBOR, as well as the transition from LIBOR to another benchmark or rates could have adverse impacts on our outstanding debt that currently use LIBOR as a benchmark rate, and ultimately, adversely affect our financial condition and results of operations.

We may need additional capital in the future and may not be able to obtain it on favorable terms, and such capital expenditure projects may not realize expected investment returns.

Our business is capital intensive, and our success depends to a significant degree on our ability to maintain our manufacturing operations and invest in those operations to expand capacity and remain competitive from a cost perspective. We may require additional capital in the future to finance capital investments, including any potential expansion or optimization of existing production facilities or mining operations, fund ongoing research and development activities and meet general working capital needs. Additionally, we entered into the Option Agreement with AMIC pursuant to which AMIC granted us an option to acquire 90% of a SPV, to which

AMIC's ownership in the Slagger in The Jazan City for Primary and Downstream Industries in the KSA will be contributed together with \$322 million of indebtedness currently held by AMIC. Upon exercise of the Option or Put, there can be no assurance that we may assume this indebtedness and may need to obtain funding to repay it. In the event we require any additional financing, such financing may not be available when needed on terms favorable to us, or at all. If we are unable to obtain adequate funds on acceptable terms, we may be unable to maintain, expand or lower the operating costs of our facilities or take advantage of future opportunities or respond to competitive pressures, which could harm our results of operations, financial condition and business prospects. Additionally, if we undertake these projects, they may not be completed on schedule, at the budgeted cost, or at all. Moreover, our revenue may not increase immediately upon the expenditure of funds on a particular project. As a result, we may not be able to realize our expected investment return, which could adversely affect our results of operations and financial condition.

Our results of operations may be adversely affected by fluctuations in currency exchange rates.

The financial condition and results of operations of our operating entities outside the U.S. are reported in various foreign currencies, primarily the South African Rand, Australian Dollars, Euros, Pound Sterling and Brazilian Real and then converted into U.S. dollars at the applicable exchange rate for inclusion in the financial statements. As a result, any volatility of the U.S. dollar against these foreign currencies creates uncertainty for, and may have a negative impact on, reported sales and operating margin. In addition, our operating entities often need to convert currencies they receive for their products into currencies in which they purchase raw materials or pay for services, which could result in a gain or loss depending on fluctuations in exchange rates. In order to manage this risk, we have, from time to time, entered into forward contracts to buy and sell foreign currencies.

Our flexibility in managing our labor force may be adversely affected by labor and employment laws in the jurisdictions in which we operate, many of which are more onerous than those of the U.S.; and some of our labor force has substantial workers' council or trade union participation, which creates a risk of disruption from labor disputes and new laws affecting employment policies.

Labor costs constituted approximately 28% of our production costs (excluding ore cost) in 2019. The vast majority of our employees are located outside the U.S. In most of those countries, labor and employment laws are more onerous than in the U.S. and, in many cases, grant significant job protection to employees, including rights on termination of employment. Moreover, many of our workforce outside the U.S. belong to unions and/or are represented by a collective bargaining agreement. As such, in such jurisdictions we are required to consult with, and seek the consent or advice of, various employee groups or works' councils that represent our employees for any changes to our activities or employee benefits. This requirement could have a significant impact on our flexibility in managing costs, achieving synergies from the Cristal Transaction and responding to market changes.

Given the nature of our chemical, mining and smelting operations, we face a material risk of liability, production delays and additional expenditures from environmental and industrial accidents.

Our business is exposed to, among other things, environmental hazards and industrial accidents the occurrence of which could delay production, suspend operations, increase repair, maintenance or medical costs and, due to the integration of our facilities, could have an adverse effect on the productivity and results of operations of a particular manufacturing facility or on our business as a whole. Furthermore, during operational breakdowns resulting from any such environmental hazard or industrial accident, the relevant facility may not become fully operational within the anticipated timeframe, which could result in further business losses. Over our operating history, we have incurred incidents of this nature. If any of the equipment on which we depend were severely damaged or were destroyed by fire, flooding, or otherwise, we may be unable to replace or repair it in a timely manner or at a reasonable cost, which would impact our ability to produce and ship our products, which would have a material adverse effect on our business, financial condition or results of operations.

Equipment upgrades, equipment failures and deterioration of assets may lead to production curtailments, shutdowns or additional expenditures.

Our operations depend upon critical equipment that require scheduled upgrades and maintenance and may suffer unanticipated breakdowns or failures. As a result, our mining operations and processing plants may be interrupted or curtailed by equipment failures, which could have a material adverse effect on our results of

operations. In addition, assets critical to our mining and chemical processing operations may deteriorate due to wear and tear or otherwise sooner than we currently estimate. Such deterioration may result in additional maintenance spending and additional capital expenditures. If these assets do not generate the amount of future cash flows that we expect, and we are not able to refurbish them or procure replacement assets in an economically feasible manner, our future results of operations may be materially and adversely affected.

Our results of operations and financial condition could be seriously impacted by security breaches, including cybersecurity incidents.

We rely on information technology systems across our operations, including internal and external communications, and the management of our accounting, finance, and supply chain functions. Our information technology is provided by a combination of internal and external services and service providers. Further, our business involves the use, processing, storage and transmission of information about customers, suppliers and employees using such information technology systems. Our ability to effectively operate our business depends on the security, reliability and capacity of these systems.

Like most major corporations, we may become the target of cyberattacks, including industrial espionage or ransomware attacks, from time to time. For instance, the Cristal business we acquired in April 2019 was subject to a significant cybersecurity attack in 2017. Failure to effectively prevent, detect and recover from security breaches, including attacks on information technology and infrastructure by hackers; viruses; breaches due to employee error or actions; or other disruptions could seriously harm our operations as well as the operations of our customers and suppliers. Such serious harm can involve, among other things, misuse of our assets, business disruptions, loss of data, unauthorized access to trade secrets and confidential business information, unauthorized access to personal information, legal claims or proceedings, reporting errors, processing inefficiencies, negative media attention, reputational harm, loss of sales, remediation and increased insurance costs, and interference with regulatory compliance. We have experienced, and expect to continue to experience, these types of cybersecurity threats and incidents, which may be material.

We have put in place security measures designed to protect against cyberattacks, security breaches and misappropriation or corruption of our systems, intentional or unintentional disclosure of confidential information, or disruption of our operations. As these threats continue to evolve, particularly around cybersecurity, we may be required to expend significant resources to enhance our control environment, processes, practices and other protective measures. Despite these efforts, we may not be able to prevent cyberattacks and other security breaches and such events could materially adversely affect our business, financial condition or results of operations.

Our failure to comply with the anti-corruption laws of the U.S. and various international jurisdictions could negatively impact our reputation and results of operations.

Doing business on a global basis requires us to comply with the laws and regulations of the U.S. government and those of various international jurisdictions, and our failure to successfully comply with these rules and regulations may expose us to liabilities. In particular, our operations are subject to U.S. and foreign anti-corruption laws and regulations, such as the U.S. Foreign Corrupt Practices Act (“FCPA”), the U.K. Bribery Act 2010 (“U.K. Bribery Act”), as well as anti-corruption laws of the various jurisdictions in which we operate. Our global operations may expose us to the risk of violating, or being accused of violating, the foregoing or other anti-corruption laws. Such violations could be punishable by criminal fines, imprisonment, civil penalties, disgorgement of profits, injunctions, and exclusion from government contracts, as well as other remedial measures. Investigations of alleged violations can be very expensive, disruptive, and damaging to our reputation. Although we have implemented anti-corruption policies and procedures, there can be no guarantee that these policies, procedures, and training will effectively prevent violations by our employees or representatives in the future. Additionally, we face a risk that our distributors and other business partners may violate the FCPA, the U.K. Bribery Act, or similar laws or regulations. Such violations could expose us to FCPA and U.K. Bribery Act liability and/or our reputation may potentially be harmed by their violations and resulting sanctions and fines.

We are subject to many environmental, health and safety regulations that may result in unanticipated costs or liabilities, which could reduce our profitability.

Our operations and production facilities are subject to extensive environmental and health and safety laws and regulations at national, international and local levels in numerous jurisdictions relating to use of natural resources, pollution, protection of the environment, mine site remediation, transporting and storing raw materials

and finished products, and storing and disposing of hazardous wastes among other materials. Moreover, certain environmental laws impose joint and several and/or strict liability for costs to clean up and restore sites where pollutants have been disposed or otherwise spilled or released. We cannot be certain that we will not incur significant costs and liabilities for remediation or damage to property, natural resources or persons as a result of spills or releases from our operations or those of a third party.

The costs of compliance with the extensive environmental, health and safety laws and regulations or the inability to obtain, update or renew permits required for operation or expansion of our business could reduce our results of operations or otherwise adversely affect our business. If we fail to comply with the conditions of our permits governing the production and management of regulated materials, mineral sands mining licenses or leases or the provisions of the relevant jurisdictional laws in which we operate, these permits, mining licenses or leases and mining rights could be canceled or suspended, and we could be prevented from obtaining new mining and prospecting rights, which could materially and adversely affect our business, operating results and financial condition. Additionally, we could incur substantial costs, including fines, damages, criminal or civil sanctions and remediation costs, or experience interruptions in our operations, for violations arising under these laws and regulations. In the event of a catastrophic incident involving any of the raw materials we use, or chemicals or mineral products we produce, we could incur material costs as a result of addressing the consequences of such event.

Changes to existing laws governing operations, especially changes in laws relating to transportation of mineral resources, the treatment of land and infrastructure, contaminated land, the remediation of mines, tax royalties, waste handling and management, exchange control restrictions, environmental remediation, mineral rights, ownership of mining assets, or the rights to prospect and mine may have a material adverse effect on our future business operations and financial performance. There is risk that onerous conditions may be attached to authorizations in the form of mining rights, water-use licenses, miscellaneous licenses and environmental approvals, or that the grant of these approvals may be delayed or not granted.

The classification of TiO₂ as a Category 2 Carcinogen in the European Union could result in more stringent regulatory control with respect to TiO₂.

In May 2016, France's competent authority under the EU's Registration, Evaluation, Authorization and Restrictions of Chemicals ("REACH") submitted a proposal to the European Chemicals Agency ("ECHA") that would classify TiO₂ as carcinogenic in humans by inhalation. In February 2020, the European Commission adopted a regulation classifying the powder form of TiO₂ as a Category 2 Carcinogen by inhalation. The labelling regulation will come into effect 18 months after adoption, approximately in June 2021. The classification of our products as a Category 2 Carcinogen could impact our business by inhibiting the marketing of products containing TiO₂ to consumers, and subject our manufacturing operations to new regulations that could increase costs. The recent classification and labelling requirements imposed by the European Commission could have additional effects under other EU laws (e.g., those affecting medical and pharmaceutical applications, cosmetics, food packaging and food additives) and/or trigger heightened regulatory scrutiny in countries and local jurisdictions outside the EU based on health and safety grounds. It is also possible that heightened regulatory scrutiny would lead to claims by consumers or those involved in the production of such products alleging adverse health impacts.

We may be subject to litigation, the disposition of which could have a material adverse effect on our results of operations.

The nature of our operations exposes us to possible litigation claims, including disputes with competitors, customers, equipment vendors, environmental groups and other non-governmental organizations, and providers of shipping services. Some of the lawsuits may seek fines or penalties and damages in large amounts, or seek to restrict our business activities. Because of the uncertain nature of any litigation and coverage decisions, we cannot predict the outcome of these matters or whether insurance claims may mitigate any damages to us. Litigation is very costly, and the costs associated with prosecuting and defending litigation matters could have a material adverse effect on our results of operations and financial condition. See Note 20 of notes to our consolidated financial statements, included elsewhere in this Form 10-K for further information regarding our commitments and contingencies.

We compete with other mining and chemical businesses for key human resources in the countries in which we operate, and our business will suffer if we are unable to hire highly skilled employees or if our key officers or employees discontinue employment with us.

We compete with other chemical and mining companies, and other companies generally, in the countries in which we operate to attract and retain key human resources at all levels with the appropriate technical skills and operating and managerial experience necessary to continue operating and expanding our businesses. These operations use modern techniques and equipment and accordingly require various types of skilled workers. The success of our business will be materially dependent upon the skills, experience and efforts of our key officers and skilled employees. Competition for skilled employees may cost us in terms of higher labor costs or reduced productivity. As a result, we may not be able to attract and retain skilled and experienced employees. Should we lose any of our key personnel or fail to attract and retain key qualified personnel or other skilled employees, our business may be harmed and our operational results and financial condition could be affected.

If we are unable to innovate and successfully introduce new products, or new technologies or processes reduce the demand for our products or the price at which we can sell products, our results of operations could be adversely affected.

Our industries and the end-use markets into which we sell our products experience periodic technological change and product improvement. Our future growth will depend on our ability to gauge the direction of commercial and technological progress in key end-use markets and on our ability to fund and successfully develop, manufacture and market products in such changing end-use markets. We must continue to identify, develop and market innovative products or enhance existing products on a timely basis to maintain our profit margins and our competitive position. If we fail to keep pace with any evolving technological innovations in our end-use markets on a competitive basis, our financial condition and results of operations could be adversely affected.

In addition, new technologies or processes have the potential to replace or provide lower-cost alternatives to our products, such as new processes that reduce the amount of TiO₂ or zircon content in consumer products which in turn could depress the demand and pricing for TiO₂ or zircon, respectively. We cannot predict whether technological innovations will, in the future, result in a lower demand for our products or affect the competitiveness of our business. We may be required to invest significant resources to adapt to changing technologies, markets and competitive environments.

Third parties may develop new intellectual property rights for processes and/or products that we would want to use, but would be unable to do so; or, third parties may claim that the products we make or the processes that we use infringe their intellectual property rights, which may cause us to pay unexpected litigation costs or damages and/or prevent us from making, using or selling products we make or require alteration of the processes we use.

Results of our operations may be negatively impacted if a competitor develops or has the right to use intellectual property rights for new processes or products and we cannot obtain similar rights on favorable terms or are unable to independently develop non-infringing competitive alternatives. Similarly, results of operations may also be negatively impacted if third parties assert that the products we make or made or the processes that we use or used infringe or infringed their intellectual property rights.

Although there are currently no pending or threatened proceedings or claims known to us that are material relating to alleged infringement, misappropriation or violation of the intellectual property rights of others, we may be subject to legal proceedings and claims in the future in which third parties allege that their patents or other intellectual property rights are infringed, misappropriated or otherwise violated by us or our products or processes. In the event that any such infringement, misappropriation or violation of the intellectual property rights of others is found, we may need to obtain licenses from those parties or substantially re-engineer our products or processes to avoid such infringement, misappropriation or violation. We might not be able to obtain the necessary licenses on acceptable terms or be able to re-engineer our products or processes successfully. Moreover, if we are found by a court of law to infringe, misappropriate or otherwise violate the intellectual property rights of others, we could be required to pay substantial damages or be enjoined from making, using or selling the infringing products or technology. We also could be enjoined from making, using or selling the allegedly infringing products or technology pending the final outcome of the suit. Any of the foregoing could adversely affect our financial condition and results of operations.

If our intellectual property were compromised or copied by competitors, or if competitors were to develop similar intellectual property independently, our results of operations could be negatively affected.

Our success depends to a significant degree upon our ability to protect and preserve our intellectual property rights. Although we own and have applied for numerous patents and trademarks throughout the world, we may have to rely on judicial enforcement of our patents and other proprietary rights. Our patents and other intellectual property rights may be challenged, invalidated, circumvented, and found unenforceable or otherwise compromised. A failure to protect, defend or enforce our intellectual property rights could have an adverse effect on our financial condition and results of operations. The protection afforded to our intellectual property varies based upon country, scope of individual patent or trademark, as well as the availability of legal remedies in each country.

We also rely upon unpatented proprietary technology, operational knowledge and other trade secrets to maintain our competitive position. While we maintain policies to enter into confidentiality agreements with our employees and third parties to protect our proprietary expertise and other trade secrets, these agreements may not be enforceable or, even if legally enforceable, we may not have adequate remedies for breaches of such agreements. We also may not be able to readily detect breaches of such agreements. In addition, there can be no assurance that others will not obtain knowledge of these trade secrets through independent development or other access by legal means. The failure of our patents or confidentiality agreements to protect our proprietary technology, operational knowledge or trade secrets could result in significantly lower revenues, reduced profit margins or loss of market share.

In addition, we may be unable to determine when third parties are using our intellectual property rights without our authorization. The undetected or unremedied unauthorized use of our intellectual property rights or the legitimate development or acquisition of intellectual property related to our industry by third parties could reduce or eliminate any competitive advantage we have as a result of our intellectual property rights, adversely affecting our financial condition and results of operations. If we must take legal action to protect, defend or enforce our intellectual property rights, any suits or proceedings could result in significant costs and diversion of our resources and our management's attention, and we may not prevail in any such suits or proceedings. A failure to protect, defend or enforce our intellectual property rights could have an adverse effect on our financial condition and results of operations.

Our ore resources and reserve estimates are based on a number of assumptions, including mining and recovery factors, future cash costs of production and ore demand and pricing. As a result, ore resources and reserve quantities actually produced may differ from current estimates.

The mineral resource and reserve estimates are estimates of the quantity and ore grades in our mines based on the interpretation of geological data obtained from drill holes and other sampling techniques, as well as from feasibility studies. The accuracy of these estimates is dependent on the assumptions and judgments made in interpreting the geological data. The assessment of geographical characteristics, such as location, quantity, quality, continuity of geology and grade, is made with varying degrees of confidence in accordance with established guidelines and standards. We use various exploration techniques, including geophysical surveys and sampling through drilling and trenching, to investigate resources and implement applicable quality assurance and quality control criteria to ensure that data is representative. Our mineral reserves represent the amount of ore that we believe can be economically mined and processed, and are estimated based on a number of factors, which have been stated in accordance with SEC Industry Guide 7, the South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves 2007 version, as amended SAMREC and the Australian code for Reporting of Exploration Results, Mineral Resources the Joint Ore Reserves Committee Code (2012) (JORC).

There is significant uncertainty in any mineral reserve or mineral resource estimate. Factors that are beyond our control, such as the ability to secure mineral rights, the sufficiency of mineralization to support mining and beneficiation practices and the suitability of the market may significantly impact mineral resource and reserve estimates. The actual deposits encountered and the economic viability of mining a deposit may differ materially from our estimates. Since these mineral resources and reserves are estimates based on assumptions related to factors discussed above, we may revise these estimates in the future as we become aware of new developments. To maintain TiO₂ feedstock and zircon production beyond the expected lives of our existing mines or to increase production materially above projected levels, we will need to access additional reserves through exploration or discovery.

If our intangible assets or other long-lived assets become impaired, we may be required to record a significant noncash charge to earnings.

We have a significant amount of intangible assets and other long-lived assets on our consolidated balance sheets. Under generally accepted accounting principles in the United States (“U.S. GAAP”), we review our intangible assets and other long-lived assets for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. Factors that may be considered a change in circumstances, indicating that the carrying value of our intangible assets and other long-lived assets may not be recoverable, include, but are not limited to, a significant decline in share price and market capitalization, changes in the industries in which we operate, particularly the impact of a downturn in the global economy, as well as competition or other factors leading to reduction in expected long-term sales or results of operations. We may be required to record a significant noncash charge in our financial statements during the period in which any impairment of our intangible assets and other long-lived assets is determined, negatively impacting our results of operations.

We could be subject to changes in tax rates, adoption of new tax laws or additional tax liabilities.

We are subject to taxation in the United States, United Kingdom, South Africa, Australia and various other foreign jurisdictions. Our future effective tax rate could be affected by changes in statutory rates and other legislative changes, or changes in determinations regarding the jurisdictions in which we are subject to tax. From time to time, the U.S. federal, state and local and foreign governments make substantive changes to tax rules and their application, which could result in higher corporate taxes than would be incurred under existing tax law and could have an adverse effect on our results of operations or financial condition. From time to time, we are also subject to tax audits by various taxing authorities. Although we believe our tax positions are appropriate, the final determination of any future tax audits could be materially different from our income tax provisions, accruals and reserves and any such unfavorable outcome from a future tax audit could have a material adverse effect on our results of operations or financial condition.

Failure to meet some or all of our key financial and non-financial targets could negatively impact the value of our business and adversely affect our stock price.

From time to time, we may announce certain key financial and non-financial targets that are expected to serve as benchmarks for our performance for a given time period, such as, projections for our future revenue growth, Adjusted EBITDA, Adjusted diluted earnings per share and free cash flow. Our failure to meet one or more of these key financial targets may negatively impact our results of operations, stock price, and stockholder returns. The factors influencing our ability to meet these key financial targets include, but are not limited to, changes in the global economic environment relating to our TiO₂ products and zircon, changes in our competitive landscape, including our relationships with new or existing customers, our ability to introduce new products, applications, or technologies, our undertaking an acquisition, joint venture, or other strategic arrangement, and other factors described within this Item 1A – Risk Factors, many of which are beyond our control.

English law and provisions in our articles of association may have anti-takeover effects that could discourage an acquisition of us by others, even if an acquisition would be beneficial to our shareholders, and may prevent attempts by our shareholders to replace or remove our current management.

Certain provisions of the U.K. Companies Act 2006 (the “Companies Act”) and our articles of association may have the effect of delaying or preventing a change in control of us or changes in our management. For example, our articles of association include provisions that:

- maintain an advance notice procedure for proposed nominations of persons for election to our board of directors;
- provide certain mandatory offer provisions, including, among other provisions, that a shareholder, together with persons acting in concert, that acquires 30 percent or more of our issued shares without making an offer to all of our other shareholders that is in cash or accompanied by a cash alternative would be at risk of certain sanctions from our board of directors unless they acted with the prior consent of our board of directors or the prior approval of the shareholders; and
- provide that vacancies on our board of directors may be filled by a vote of the directors or by an ordinary resolution of the shareholders.

In addition, public limited companies are prohibited under the Companies Act from taking shareholder action by written resolution. These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our management.

Although we do not anticipate being subject to the U.K. City Code on Takeovers and Mergers, such Takeover Code may still have anti-takeover effects in the event the Takeover Panel determines that such Code is applicable to us.

The U.K. City Code on Takeovers and Mergers (“Takeover Code”) applies, among other things, to an offer for a public company whose registered office is in the U.K. (or the Channel Islands or the Isle of Man) and whose securities are not admitted to trading on a regulated market in the U.K. (or on any stock exchange in the Channel Islands or the Isle of Man) if the company is considered by the Panel on Takeovers and Mergers (“Takeover Panel”) to have its place of central management and control in the U.K. (or the Channel Islands or the Isle of Man). This is known as the “residency test.” The test for central management and control under the Takeover Code is different from that used by the U.K. tax authorities. Under the Takeover Code, the Takeover Panel will determine whether we have our place of central management and control in the U.K. by looking at various factors, including the structure of our board of directors, the functions of the directors and where they are resident.

Given that a majority of the members of our Board of Directors reside outside the United Kingdom, we do not anticipate that we will be subject to the Takeover Code. However, if at the time of a takeover offer, the Takeover Panel determines that we have our place of central management and control in the U.K., we would be subject to a number of rules and restrictions, including but not limited to the following: (1) our ability to enter into deal protection arrangements with a bidder would be extremely limited; (2) we might not, without the approval of our shareholders, be able to perform certain actions that could have the effect of frustrating an offer, such as issuing shares or carrying out acquisitions or disposals; and (3) we would be obliged to provide equality of information to all bona fide competing bidders.

As a public limited company incorporated in England and Wales, certain capital structure decisions requires approval of our shareholders, which may limit our flexibility to manage our capital structure.

The Companies Act generally provides that a board of directors of a public limited company may only allot shares (or grant rights to subscribe for or convertible into shares) with the prior authorization of shareholders, such authorization stating the maximum amount of shares that may be allotted under such authorization and specify the date on which such authorization will expire, being not more than five years, each as specified in the articles of association or relevant shareholder resolution. We obtained previous shareholder authority to allot additional shares for a period of five years from February 25, 2019, which authorization will need to be renewed at least upon expiration (five years from February 25, 2019) but may be sought more frequently for additional five-year terms (or any shorter period).

The Companies Act generally provides that existing shareholders of a company have statutory pre-emption rights when new shares in such company are allotted and issued for cash. However, it is possible for such statutory pre-emption right to be disapplied by either shareholders passing a special resolution at a general meeting, being a resolution passed by at least 75% of the votes cast, or by inclusion of relevant provisions in the articles of association of the company. Such a disapplication of statutory pre-emption rights may not be for more than five years. We obtained previous shareholder authority to disapply statutory pre-emption rights for a period of five years from February 25, 2019, which disapplication will need to be renewed upon expiration (i.e., at least every five years) to remain effective, but may be sought more frequently for additional five-year terms (or any shorter period).

The Companies Act generally prohibits a public limited company from repurchasing its own shares without the prior approval of its shareholders by ordinary resolution, being a resolution passed by a simple majority of votes cast, and subject to compliance with other statutory formalities. Such authorization may not be for more than five years from the date on which such ordinary resolution is passed. We obtained previous shareholder authority to repurchase shares for a period of five years from February 25, 2019, which authorization will need to be renewed at least upon expiration (i.e., five years from February 25, 2019) but may be sought more frequently for additional five-year terms (or any shorter period).

Economic conditions and regulatory changes following the U.K.'s exit from the E.U. could adversely impact our operations, operating results and financial condition.

The U.K. left the E.U. (often referred to as Brexit) on January 31, 2020. The U.K. is currently in a transition period that will continue until December 31, 2020. During this period, the U.K. has effectively remained in the E.U.'s customs union and single market and is continuing to follow the E.U.'s rules. The U.K. and the E.U. are currently negotiating new agreements to regulate their relationship post-December 31, 2020. If both the U.K. and the E.U. agree, the transition period may be extended and it could remain in place for a maximum of two years until December 31, 2022. The U.K. government has said, however, that it will not seek an extension and has enacted legislation prohibiting the U.K. from extending the transition period.

It is expected that Brexit will impact economic conditions in the U.K. and the E.U. The future effects of Brexit will depend on any agreements the U.K. makes to retain access to the E.U. or other markets. Given the lack of comparable precedent, it is unclear what financial, trade and legal implications the withdrawal of the U.K. from the E.U. will have and how such withdrawal will affect us.

The consequences of Brexit, together with the significant uncertainty regarding the terms of the agreements which will govern the relationship between the U.K. and the E.U. post-December 31, 2020, could introduce significant uncertainties into global financial markets and adversely impact the markets in which we and our customers operate. Brexit could also create uncertainty with respect to the legal and regulatory requirements to which we are subject and lead to divergent national laws and regulations as the U.K. government determines which E.U. laws to replace or replicate.

Due to Brexit, adverse consequences such as deterioration in economic conditions, volatility in currency exchange rates or adverse changes in regulation could have a negative impact on our future operations, operating results and financial condition.

Transfers of our ordinary shares outside The Depository Trust may be subject to stamp duty or stamp duty reserve tax in the U.K., which would increase the cost of dealing in shares in New Tronox.

Except for ordinary shares received by a holder deemed to be an affiliate of us for purposes of U.S. securities laws, our ordinary shares have been issued to a nominee for The Depository Trust Company ("DTC") and corresponding book-entry interests credited in the facilities of DTC. On the basis of current law and HM Revenue and Customs ("HMRC") practice, no charges to U.K. stamp duty or stamp duty reserve tax ("SDRT") are expected to arise on the issue of the ordinary shares into DTC's facilities or on transfers of book-entry interests in ordinary shares within DTC's facilities.

Shareholders are strongly encouraged to hold their ordinary shares in book entry form through DTC. Transfers of shares held in book entry form through DTC currently do not attract a charge to stamp duty or SDRT in the U.K. A transfer of title in the shares from within the DTC system out of DTC and any subsequent transfers that occur entirely outside the DTC system will attract a charge to stamp duty at a rate of 0.5% of any consideration, which is payable by the transferee of the shares. Any such duty must be paid (and the relevant transfer document, if any, stamped by HMRC) before the transfer can be registered in our books. However, if those shares are redeposited into DTC, the redeposit will attract stamp duty or SDRT at the rate of 1.5% to be paid by the transferor.

We have put arrangements in place such that directly held ordinary shares cannot be transferred into the DTC system until the transferor of the ordinary shares has first delivered the ordinary shares to a depository specified by us so that SDRT may be collected in connection with the initial delivery to the depository. Any such ordinary shares will be evidenced by a receipt issued by the depository. Before the transfer can be registered in our books, the transferor will also be required to put the depository in funds to settle the resultant liability to SDRT, which will be charged at a rate of 1.5% of the value of the shares.

Our articles of association provide that the courts of England and Wales have exclusive jurisdiction to determine any dispute brought by a shareholder in that shareholder's capacity as such and certain other matters.

Our articles of association provide that the courts of England and Wales have exclusive jurisdiction to determine any dispute brought by a shareholder in that shareholder's capacity as such, or related to or connected with any derivative claim in respect of a cause of action vested in us or seeking relief on our behalf, against us

and/or the board and/or any of the directors, former directors, officers, employees or shareholders individually, arising out of or in connection with our articles of association or (to the maximum extent permitted by applicable law) otherwise. This choice of forum provision may limit a shareholder’s ability to bring a claim in a judicial forum that the shareholder believes is favorable for disputes with us or our directors, former directors, officers, employees or shareholders which may discourage lawsuits against us and our directors, former directors, officers, employees or shareholders.

There may be difficulty in effecting service of legal process and enforcing judgments against us and our directors and management.

We are incorporated under the laws of England and Wales and a substantial portion of our assets are located outside of the U.S. The U.S. and the U.K. do not currently have a treaty providing for the recognition and enforcement of judgments, other than arbitration awards, in civil and commercial matters. The enforceability of any judgment of a U.S. federal or state court in the U.K. will depend on the laws and any treaties in effect at the time, including conflicts of laws principles (such as those bearing on the question of whether a U.K. court would recognize the basis on which a U.S. court had purported to exercise jurisdiction over a defendant). In this context, there is doubt as to the enforceability in the U.K. of civil liabilities based solely on the federal

securities laws of the U.S. In addition, awards for punitive damages in actions brought in the U.S. or elsewhere may be unenforceable in the U.K.. An award for monetary damages under U.S. securities laws would likely be considered punitive if it did not seek to compensate the claimant for loss or damage suffered and was intended to punish the defendant.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

Below are our primary offices and facilities at December 31, 2019. We believe our properties are in good operating condition, and are well maintained. Pursuant to separate financing agreements, substantially all of our material U.S., European and Australian properties are pledged or encumbered to support or otherwise provide security for our indebtedness.

Our primary office locations consisted of the following:

Location	Owned/Leased	Offices
Stamford, Connecticut	Leased	263 Tresser Boulevard, Suite 1100
Stallingborough, United Kingdom	Leased	Laporte Road
New York, New York	Leased	410 Park Avenue
Oklahoma City, Oklahoma	Owned	3301 NW 150 Street

Mining Operations

Tronox owns and operates five mining-mineral processing supply chains, each including one or more heavy mineral sand mines producing heavy mineral concentrates to feed a dedicated mineral separation plant. Two operations are in South Africa: Namakwa Sands, Western Cape, and KZN Sands, KwaZulu-Natal. Three operations are in Australia: our Northern Operations and Southern Operations are in the coastal plain of Western Australia; and our Eastern Operations are in the New South Wales portion of the Murray Basin, Australia.

In South Africa, the Namakwa Sands operations include two open-pit mines, each with a dedicated primary concentration plant, and a secondary concentration plant at Brand-se-Baai, a mineral separation (“dry”) plant at Koekenaap, and a two-furnace smelter at Saldanha, Western Cape, South Africa. The KZN operations have an open pit mine at Fairbreeze with a primary concentration plant, a mineral separation plant at Empangeni alongside a two furnace smelter complex, and export facilities at the port of Richards Bay.

The Western Australia operations are in two supply chains: the North Perth Basin, consisting of the Cooljarloo dredge mine and floating heavy mineral concentration plant, and the Chandala metallurgical complex near Muchea, consisting of a mineral separation plant and a synthetic rutile (“SR”) plant; and the South Perth Basin, consisting of a dry open pit mine at Wonnerup with primary concentration of HMC and a mineral separation plant at Bunbury.

The Eastern Operations in the Murray Basin of Australia include two operating dredge mines at Ginkgo and Snapper and a mineral separation plant at Broken Hill, NSW.

Pigment Operations

Our pigment facilities consist of the physical assets necessary and appropriate to produce, distribute and supply our TiO₂ products and consist mainly of manufacturing and distribution facilities. The following table lists our TiO₂ production facilities and capacity (in metric tonnes per year), by location:

<u>Facility</u>	<u>Production</u>	<u>TiO₂ Capacity</u>	<u>Process</u>
Hamilton, Mississippi, USA	TiO ₂	225,000	Chloride
Kwinana, Western Australia	TiO ₂	150,000	Chloride
Kemerton, Western Australia	TiO ₂	110,000	Chloride
Botlek, the Netherlands	TiO ₂	90,000	Chloride
Stallingborough, England, United Kingdom	TiO ₂	165,000	Chloride
Yanbu, Saudi Arabia	TiO ₂	200,000	Chloride
Salvador, Bahia, Brazil	TiO ₂	60,000	Sulphate
Fuzhou, Jiangxi Province, China	TiO ₂	46,000	Sulphate
Thann, Alsace, France	TiO ₂	32,000	Sulphate

Mineral Properties

As of December 31, 2019, we owned mining rights to ore reserves described herein at five heavy mineral sands operations in South Africa and Australia, where we mine heavy mineral sands to supply titanium mineral feedstock to our TiO₂ manufacturing business and co-products for external sale.

Reporting of Ore Reserves

U.S. registrants are required to report ore reserves under SEC Industry Guide 7 of the Securities Act of 1933, “Description of Property by Issuers Engaged or To Be Engaged in Significant Mining Operations”. Industry Guide 7 (“IG7”) requires that sufficient technical and economic studies have been completed to reasonably assure economic extraction of the declared reserves, based on the parameters and assumptions current to the end of the reporting period.

Tronox operations personnel have for years followed SAMREC (South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves) and JORC (Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves) guidelines to internally update our year-end mineral reserve and mineral resource estimates.

Our mineral reserve estimates are based on geological resource models modified by various mining and processing factors and assessed in a techno-economic model for commercial viability. This constitutes a Life-of-Mine-Plan (LOMP) for each operation. These LOMP’s have been developed by teams of Tronox professionals with diverse, complementary skills and an intimate knowledge of their respective operations. A LOMP takes into account the mineral reserves and resources, realistic assumptions of geological, mining, metallurgical, economic, marketing, legal, environmental, social, governmental, engineering, operational and all other modifying factors in sufficient detail to demonstrate at the time of reporting that extraction is reasonably justified. Our mineral reserve estimates are subject to internal controls to ensure their accuracy and validity.

Proven Reserves have a higher level of confidence than *Probable Reserves*. Not all HMS deposits are alike, and resources with internal variability in grade, HM (“heavy mineral”) assemblage, or other characteristics are not classified as reserves until sufficient drilling density and statistical validation improves our level of confidence in the estimates. The heavy mineral reserves table below is a summary of Reserves determined as economically-exploitable by individuals certified under SAMREC or JORC disclosure guidelines as “Competent Persons” or “Qualified Persons,” to prepare mineral resource and reserves estimates. No “qualified person” requirement exists under IG7 rules.

Mining and Mineral Tenure

Industry Guide 7 requires us to describe our rights to access and mine the minerals we report as ore reserves and to disclose any change in mineral tenure of material significance. Our heavy mineral exploration

and mining activities in South Africa and Australia are regulated by the South African Department of Mineral Resources, the Western Australia Department of Mines, Industry Regulation and Safety and the New South Wales Department of Planning, Industry and Environment. All exploration and mining activities are subject to multiple levels of environmental regulatory review, including approvals of environmental plans and public comment periods as pre-conditions to granting of mineral tenure.

Mineral Tenure - South Africa

Our two South African mineral sand mining processing chains are operated by Namakwa Sands and KZN Sands, both business units of Tronox Holdings plc. The South African Department of Mineral Resources (“DMR”) is the regulatory administrator of mineral rights in South Africa, subject to the provisions of the Mineral and Petroleum Resources Development Act (“MPRDA”), No. 28 of 2004, as amended in 2016. The MPRDA vests all mineral rights in South Africa in the national government and establishes conditions for the acquisition and maintenance of prospecting and mining rights. Prospecting rights and mining rights may only be granted by the DMR. Prospecting rights are granted for a maximum period of five years and can be renewed once for an extension of up to three years. Prospecting rights may be revoked for non-compliance with the terms of the prospecting right.

Mining right applications require additional approvals by the Department of Environmental Affairs (“DEA”) of an Environmental Management Program (“EMP”) and an Integrated Water and Land Use License. Our South African operations are 74%-owned by Tronox through its subsidiaries, Tronox Mineral Sands (Pty) Ltd and Tronox KZN Sands (Pty) Ltd, with the remaining 26% being owned by Exxaro.

Mining rights are valid for up to 30 years and may be extended by 30-year renewals, subject to compliance with conditions established in the EMP and by the MPRDA. Environmental permitting and compliance are co-administered by the regional offices of DEA and Development Planning. All rights, licenses and permits for Namakwa Sands and KZN Sands are in good standing.

Tronox holds mining rights over an area of 19,205 hectares (47,457 acres) and surface rights totaling 17,621 hectares (43,542 acres) at the active mining site near Brand-se-Baai. An additional 5,845 hectares (14,443 acres) of prospecting rights are held at satellite exploration projects.

Tronox also controls mining and prospecting rights in KwaZulu-Natal Province, on South Africa’s Indian Ocean coast, through Tronox KZN Sands (Pty) Ltd, a subsidiary of Tronox. Mining Authorizations cover approximately 4,140 hectares (10,230 acres) at Fairbreeze, where surface access rights are either owned directly by KZN Sands or secured by agreements with Mondi Ltd. A further 4,790 hectares (11,836 acres) of prospecting rights are held by KZN Sands at the nearby Port Durnford and Waterloo project areas.

Mineral Tenure - Australia

Our Australian mineral properties are divided into the Northern and Southern Operations of the Swan Coastal Plain of Western Australia and the Eastern Operations of the Murray Basin in New South Wales and Victoria. Mining tenements in Australia are managed at the State or Territorial level. In Western Australia, Mining Leases, Exploration Licenses and Retention Licenses are granted and administered by the Western Australian Department of Mines, Industry Regulation and Safety, and in New South Wales by the NSW Department of Planning, Industry and Environment, under the authority of the Western Australian Mining Act 1978 and the New South Wales Mining Act 1992, respectively. Principal environmental authorities are the Western Australian Department of Water and Environmental Regulation and the NSW Environment Protection Authority.

In the North Perth Basin, Western Australia, Tronox controls mining leases, exploration and other licenses and rights covering a total 54,264 hectares (134,089 acres). Mining and Public Environmental Review plans are approved for the Cooljarloo mine and the planned Dongara mine. Environmental Protection Agency approval of Cooljarloo West is anticipated during 2020. The main Cooljarloo deposit covers 9,745 hectares (24,080 acres). We hold 14 mining leases at the Dongara project. Three older mining leases are held at our Jurien property, the site of a former heavy minerals open pit mine operated by another party in the 1970’s.

Under the Cristal transaction, Tronox acquired mining and exploration licenses totaling 559,682 hectares (1,383,004 acres) in the South Perth Basin and Murray Basin heavy mineral provinces of Australia. Many of these mining properties were originally acquired by Cable Sands Pty Ltd, starting in the 1950’s, and some

mineral tenure remains under Cable Sands as a Tronox subsidiary. The acquisition of Cable by Bemax in 2004, Bemax by Cristal in 2008, and Cristal by Tronox in 2019 transfers these assets and a rich legacy of innovation in heavy mineral mining and processing as well as responsible environmental stewardship to Tronox.

The Southern Operations in the southwest of Western Australia comprises 31 mining leases, 5 exploration licenses, 3 retention licenses, 2 general purpose leases and 2 miscellaneous licenses totaling 19,682 hectares.

Tronox holds 4 mining leases, 15 exploration licenses, 2 retention licenses, and 1 assessment lease in our Eastern Operations in the Murray Basin of New South Wales, Victoria and South Australia. The tenements cover about 540,000 hectares (2,085 sq miles). Three mining leases west of Pooncarie, NSW cover about 9,834 hectares (48,635 acres) surrounding our active mines at Ginkgo, Snapper and Crayfish. One mining lease of 23,332 hectares is at the Atlas/Campaspe project, NSW.

Mineral Sands - South Africa and Australia

Heavy mineral sand (HMS) deposits are natural concentrations of granular minerals of high densities (conventionally above about 2.85 gm/cm³). The heavy mineral assemblage of a particular HMS deposit generally reflects the HM contained in local and regional source rocks, and titanium-rich HMS deposit source rocks are typically granitic and/or high-grade metamorphic crystalline rocks. Factors that influence the formation of HMS deposits include erosion of crystalline source rocks, fluvial transport to the coastline, longshore drift, coastal geomorphology, deposition of heavy minerals, and prolonged natural sorting of heavy minerals by water and wind, according to the density, size and shape of HM grains. Post-depositional geological processes that can affect the economic viability of a HMS deposit include in situ weathering, induration of the host sands, and natural preservation or destruction of the HMS deposit.

Not all heavy minerals have commercial value, and a distinction is made between the Total Heavy Minerals (“THM”) and Valuable Heavy Minerals (“VHM”). Typical VHM assemblages include the titanium-iron oxide mineral, ilmenite (TiFeO₃); rutile, a premium titanium mineral (TiO₂), leucoxene, a naturally-upgraded variety of ilmenite; and zircon, a zirconium silicate (ZrSiO₄) valuable for its use in a diverse range of industrial and construction applications. Other HM of commercial value, such as garnet, staurolite, kyanite and monazite, may be recovered as by-products.

Our TiO₂ business explores, acquires, mines and processes heavy mineral sands to produce concentrates of titanium minerals and VHM co-products, particularly zircon. Heavy mineral concentrates (“HMC”) from primary concentration at our mines are transported to our integrated mineral separation plants (MSP) to separate and concentrate VHM by gravity, magnetic and electrostatic techniques. Multiple grades of titanium minerals and zircon may be produced from each MSP. We upgrade ilmenite into titanium slag at our two South African operations and SR at our Chandala metallurgical complex in Western Australia. Our captive titanium mineral products provide a secure, long-term low-cost supply of high-grade feedstock for our TiO₂ manufacturing facilities.

Our mineral property disclosures express grade in terms of the percentage of THM by weight in the ore and VHM as percentages of ilmenite, rutile + leucoxene, and zircon in the heavy mineral assemblage. Our Reserve estimates are based solely upon the value of recoverable zircon, rutile, ilmenite and leucoxene.

In 2019, we produced concentrates of ilmenite, rutile, leucoxene, and zircon from six operations: Namakwa Sands, Western Cape, South Africa; KZN Sands, KwaZulu-Natal, South Africa; Northern Operations, Western Australia, Southern Operations, Western Australia; Eastern Operations, Murray Basin, New South Wales, Australia; and Paraiba, Brazil (processing capacity figures have not been included in the chart below given its near the end of its life). Ilmenite from our Namakwa and Fairbreeze mines in South Africa is converted to titanium slag at our smelters at Saldanha Bay Western Cape and Empangeni, KwaZulu-Natal, respectively. Ilmenite from our Cooljarloo mine in Western Australia is converted to SR at our Chandala metallurgical complex and is most commonly used as feedstock to our TiO₂ pigment plants at Kwinana and Kemerton south of Perth. Our vertically-integrated mining-processing operations satisfy the bulk of feedstock requirements for our nine TiO₂ manufacturing facilities in the United States, The Netherlands, France, the United Kingdom, Brazil, Saudi Arabia, China and Western Australia.

TRONOX MINERAL SAND - MINERAL PROCESSING CAPACITIES - (metric tonnes per year)

Product	Namakwa Sands RSA	KZN Sands RSA	Northern Ops W.A.	Southern Ops W.A.	Eastern Ops NSW	Total
Rutile ⁽¹⁾	30,000	25,000	35,000	10,000	70,000	170,000
Synthetic rutile	—	—	220,000	—	—	220,000
Titanium slag	190,000	220,000	—	—	—	410,000
Pig Iron	100,000	120,000	—	—	—	220,000
Zircon ⁽²⁾	125,000	55,000	40,000	9,000	65,000	294,000

(1) includes natural rutile + leucoxene

(2) includes multiple grades of zircon

The data are generalized to reflect current mining and processing capabilities, and may differ slightly from design capacities.

Minor amount of ilmenite production is retained for strategic feedstocks or commercial sales

Namakwa Sands, Western Cape, South Africa

Our heavy mineral sand operations in South Africa include similar material flows from integrated mine-mineral separation-smelter value chains on the west and east coasts of South Africa. Both Namakwa, Western Cape and KZN Sands, KwaZulu-Natal produce smelter products of titanium slag and pig iron from ilmenite, plus commercial grades of zircon and high-grade rutile ± leucoxene concentrates.

The Namakwa Sands heavy mineral deposit at Brand-se-Baai was discovered in 1986 by Anglo American, who commissioned the integrated mine-MSP-smelter project in 1995. Ore is excavated from two open-pit dry mines and delivered by trucks and conveyors to two primary wet concentration plants. Heavy Mineral Concentrate is separated into magnetic and non-magnetic fractions at a secondary concentration plant at the mine. The two fractions are further processed at a mineral separation plant (“dry mill”) 52 km south at Koekenaap. Ilmenite, rutile and zircon are transported by rail from Koekenaap to Saldanha Bay, where ilmenite is smelted in a two-furnace complex into titanium slag and pig iron. Chloride-grade slag, slag fines, pig iron, rutile and zircon are exported from our proprietary facilities at the Saldanha Bay deep-water port, about 150 km north of Cape Town.

Namakwa Sands reserve estimates as of December 31, 2019, in accordance with SAMREC (2016) reporting standards, are: 45.6 million tonnes in-place HM, containing about 21.9 million metric tonnes ilmenite, 4.8 million tonnes zircon, and 4.6 million tonnes rutile and leucoxene from 748 million tonnes of ore. Mining of 22 million tonnes of ore in 2019 was offset by the conversion of 111 million tonnes of mineral resources to ore reserves, resulting in a net increase in reserves of about 89 million tonnes.

The Namakwa Sands HM deposit occupies an ellipsoidal area of 15 kilometers northeasterly by 4 km wide and is interpreted to be an ancient dune complex shaped by prevailing winds at the time of its formation. Repetitive cycles of erosion from crystalline source rock, fluvial transport and prolonged reworking by water and wind formed the deposit.

The Namakwa Sands heavy mineral assemblage is heterogeneous, creating challenges to efficient recovery of valuable heavy minerals. Significant amounts of low-value heavy minerals in the Namakwa HM assemblage include: garnet, pyroxene, hematite, magnetite, and kyanite. Most of the ore reserves are hosted by a complex dune sand sequence over 40 meters thick, known as the Orange Feldspathic Sand (“OFS”). The OFS is significantly affected by the formation of hard duricrust layers and lenses, interpreted to be a chemical precipitate of variable amounts of silicon (Si), calcium (Ca), magnesium (Mg), iron (Fe), aluminum (Al) and other constituents from alkaline groundwater. The duricrust is superimposed upon HM-bearing strata and adversely affects VHM recoveries. Additional reserves are hosted at the surface by a sheet-like layer of iron oxide-stained, wind-blown sand known as the red aeolian sand (RAS). Little overburden is present.

Adjustments to our geotechnical-economic modelling and a comprehensive metallurgical program have enabled division of the West and East deposits into multiple geological domains based on mineralogical and processing characteristics. A better understanding of the Namakwa deposit has led to improvements in liberation and recoveries of VHM.

KZN Sands, KwaZulu-Natal, South Africa

Our KZN Sands integrated mining-processing operation was commissioned by Iscor Heavy Minerals, predecessor to the Mineral Sands division of Exxaro Resources Ltd, which merged with Tronox in 2012. KZN Sands operates the open-cut Fairbreeze mine, 8 km south of the coastal town of Mtunzini, the Central Processing Complex, 30 km west of Richards Bay, and bulk export facilities at the port of Richards Bay.

The Fairbreeze deposit is hosted by deeply weathered “Berea-type” sands which are mined using a combination of track dozers and a hydraulic mining technique that was pioneered for HMS mining at our Hillendale mine, now nearing complete rehabilitation. High-pressure water jets disaggregate the fine-grained sand into a slurry that is pumped to a primary wet plant to produce heavy mineral concentrate, which is hauled by truck 45 km to the Empangeni CPC for separation into commercial zircon and rutile concentrates, and ilmenite feed for the adjacent two-furnace smelter. Except for local consumption of some pig iron, all saleable products are exported from Richards Bay, including high-grade titanium feedstocks for our TiO₂ pigment plants.

The Fairbreeze deposit is hosted by a complex of strandline/paleo-dune couplets, about two kilometers inland from the modern coastline, forming an elongate ridge extending about 12 km south-southwesterly from the town of Mtunzini with a maximum width of about two kilometers. No overburden is present. Modern erosion has dissected the deposit into five discrete ore bodies. The Fairbreeze dune complex is part of a regional, coast-parallel corridor of terraces and dunes collectively known as the Berea Red Sands that formed along the southeastern coast of Africa from Durban to Mombasa, in response to static sea levels of the Pliocene-Pleistocene. As with all heavy mineral sand deposits, iron-titanium oxides, rutile, zircon and other minerals in the HM assemblage at Fairbreeze are inherited from their source rock provenance and modified by selective sorting during deposition. Probable source rocks for the HM are the Natal Metamorphic Province and younger rift-related basalts.

Reserve estimates for KZN Sands as of December 31, 2019 in accordance with SAMREC (2016) reporting standards, are: 233 million tonnes ore averaging 5.7% total heavy minerals. Mining depletion of about 10 million tonnes of reserves and addition of about one million tonnes from new drilling information result in a net decrease of about nine million tonnes ore and 0.8 million tonnes in-place THM from our 2018 reserves.

Northern Operations, Western Australia

Our mineral properties of the coastal plain of Western Australia are located within two historically important heavy mineral provinces. Our combined Cooljarloo dredge mine and planned Cooljarloo West dredge mine, 170 km north of Perth, contain proven and probable reserves of 7.5 million tonnes in-place HM. Reserves at our future Dongara mine, about 65 km southeast of Geraldton, are 3.4 million tonnes of in-place HM.

Our Cooljarloo mine and Chandala MSP and SR facility, 170 km and 65 km, respectively, north of Perth, started production in 1989 as part of the Tiwest Joint Venture, an integrated mine-to-pigment enterprise between Kerr-McGee Chemical Corp and Minproc Ltd. Subsequent reorganizations of both partners led to 100% ownership of Tiwest under Tronox in 2012.

Two dredges in a single pond feed an ore slurry to a floating concentrator to produce HMC, which is hauled by trucks 110 km south to our Chandala metallurgical complex near Muchea, 60 km north of Perth, for the recovery of ilmenite, rutile, leucoxene and zircon. Ilmenite is upgraded at Chandala to SR, a high-TiO₂ feedstock for our Kwinana and other TiO₂ pigment plants

Cooljarloo reserves as of December 31, 2019 are 286 million tonnes of ore, containing 5.1 million tonnes of in-place heavy minerals. The mining of low-grade ore at Cooljarloo is supported by economies of scale, low-cost dredging, a high-quality VHM suite that constitutes nearly 80% of THM, and good processing characteristics of the ilmenite in its conversion to SR. Upon exhaustion of Cooljarloo ore, the dredge mine will be relocated to Cooljarloo West, where reserves from three-ore bodies contain an estimated 2.6 million tonnes of in-place heavy minerals.

At Dongara, multiple feasibility studies, drilling, and dry-mining optimization over the past 15 years identify reserves of 68 million tonnes ore at an average grade of 5.1% THM in five deposits, for which mining and environmental approvals have been secured.

Heavy mineral deposits of our Northern Operations generally occur as stacked, elongate, NNW-trending bodies parallel to the modern coastline, bounded to the east by the Gingin Scarp. A swarm of HM deposits in the

Cooljarloo district span an area of 40 km NNW by a width of over 5 km. Heavy minerals derived from the crystalline “basement” of the Yilgarn craton east of the scarp and Mesozoic sediments of the North Perth Basin west of the scarp are associated with marine still-stands on a wave-cut platform, as HM sands accumulated in shoreline, dunal and other coastal environments of a westward-regressing seacoast.

Our total heavy mineral Reserves at December 31, 2019 in our Northern Operations, including Cooljarloo, Cooljarloo West and Dongara are 484 million tonnes of ore containing 10.9 million tonnes of in-place heavy minerals, representing a 0.9% decrease in THM from our year-end 2018 estimate. Depletion of 23 million tonnes and sterilization of about three million tonnes ore from the Cooljarloo mine were largely offset by remodeling and optimization of mining models for Dongara and Cooljarloo. Included in the in-ground heavy mineral reserves are approximately 6.4 million tonnes ilmenite, 1.2 million tonnes zircon, and over 900,000 combined tonnes of rutile and leucoxene.

Southern Operations, Western Australia

Our mineral properties in the South-West of Western Australia were acquired in the Cristal Transaction in 2019. Mining in the Capel heavy mineral province began in 1956 by Cable Sands Pty Ltd, acquired in 2004 by Bemax Resources Ltd, which in turn was acquired by Cristal in 2008. Most mineral properties, licenses and permits in our Southern Operations are held under Cable Sands, now a Tronox subsidiary.

We extract heavy minerals from the Wonnerup North open-cut HMS mine, 10 km east of Busselton, from which HMC is trucked to our MSP at Bunbury, adjacent to the Bunbury port. Most of our reported Reserves as of December 31, 2019 are in the Wonnerup North deposit, in which mining has recently commenced. The Bunbury MSP also processes streams of HM concentrates sorted by their magnetic susceptibilities from our Broken Hill MSP in New South Wales.

The Wonnerup North deposit is a shallow (~3m deep) windblown dunal deposit on the Capel paleo-shoreline, one of two strandlines, along with the Yoganup paleo shoreline, located 7 km and 15 km inland, respectively, from the modern Indian Ocean coast associated with most of the economic HMS deposits of the region. Our Southern Operations Ore Reserves total 1.2 million tonnes of in-place total heavy minerals, as of December 31, 2019. Mining commenced at Wonnerup North in June 2019 after the completion of mining at Wonnerup South. All HMC was fed to our Bunbury MSP for recovery of commercial mineral concentrates.

Ilmenite-dominant heavy mineral deposits of the South Perth Basin occur as multiple, arcuate bands, parallel to the J-shaped Geographe Bay modern shoreline. These “fossil” shorelines become progressively younger from east-to-west, reflecting HM accumulations on paleo-beaches as the sea regressed across the Swan Coastal Plain during the Late Pliocene-Pleistocene. Ore controls include: proximity of the Yilgarn Craton, the provenance for the heavy minerals geomorphology of the Geographe Bay coast, and high-energy waves that concentrated HM and winnowed out quartz and other diluting minerals on paleo-shorelines of a wave-cut platform.

Eastern Operations, Murray Basin, New South Wales, Australia

Our Eastern Operations, acquired in the Cristal Transaction, are located in the Murray Basin, a 300,000-square-mile intra-cratonic sedimentary basin covering parts of Victoria, New South Wales, and South Australia. Our operating mines at Ginkgo, Crayfish and Snapper are about 40 km west of Pooncarie, New South Wales. Dredge mining commenced at Ginkgo in 2006, and at Snapper in 2010. Dry-mining at Crayfish, a small deposit adjunct to Ginkgo, started in September 2019, from which ore is hauled to the Ginkgo dredge pond.

Economic concentrations of heavy minerals in the Murray Basin are found in sandy sediments associated with Pliocene coastal sand deposits, formed during marine still-stands. Higher heavy mineral grades occur as parallel, linear bands that reflect HM accumulations on paleo-strandlines. Overburden at our Ginkgo and Snapper mines is removed by conventional mining methods, followed by dredge mining of ore.

HMC from Ginkgo-Snapper is hauled by trucks approximately 240 km to our MSP in Broken Hill, NSW. The Broken Hill MSP utilizes magnetic separation techniques to produce commercial concentrates of ilmenite and leucoxene, and a non-magnetic HM concentrate. The products are railed about 430 km to the port of Adelaide, South Australia. The non-magnetic concentrates are shipped to the Bunbury MSP for further processing into final products.

HMC production from our Eastern Operations for 2019 was approximately 344,000 tonnes. Overall production at Ginkgo was lower than previous years due to non-use of the floating concentrator during September 2018 to August 2019. At current production rates, mining is scheduled to be completed at Snapper in 2021 and at Ginkgo/Crayfish in 2022.

Federal and State approvals have been granted for a new mine at our Atlas/Campaspe project, 90 km north of Balranald, NSW and approximately 270 km from Broken Hill. Development began in 2018, and mining is expected to commence in 2020. Estimated Reserves are 5.7 million tonnes of in-place THM.

Our total heavy mineral reserves at December 31, 2019 in our Eastern Operations, including the Ginkgo, Crayfish, Snapper, Atlas and Campaspe HMS deposits, are 162 million tonnes of ore containing 7.2 million tonnes of in-place heavy minerals.

Vertically Integrated

Our TiO₂ value chain is the largest fully-integrated TiO₂ value chain in the world, and our TiO₂ business is the world's only mining-mineral processing chain with production of both titanium slag and synthetic rutile. Our South African slag, Australian synthetic rutile, and natural rutile from multiple mining-processing operations satisfy the majority of our internal TiO₂ feedstock requirements.

There is a high degree of substitutability among natural rutile, synthetic rutile, and titanium slag as titanium feedstocks for chloride pigment production. The commercial value of titanium feedstock is a function not only of TiO₂ content and supply and demand balances, but is also influenced by particle size, trace element geochemistry, logistics and other factors. The global TiO₂ industry is a value-added supply chain, with final product prices for TiO₂ pigment, typically more than 10x higher than that of ilmenite, the backbone of the global titanium mineral supply. The revenue assumptions for titanium feedstocks applied in the determination of heavy mineral ore reserve estimates are based on market intelligence gathered from internal and external experts, sales contracts and historic pricing.

Our LOMP and reserve estimates are derived from detailed techno-economic models created from extensive geological, mining and analytical databases, and optimized with respect to anticipated revenues and costs. Cost assumptions are developed from our extensive experience and include mining parameters, processing recoveries, foreign exchange, and rehabilitation. Each of our operations reconcile predicted mining and processing metrics with actual production and recovery data on a monthly basis. Our models are updated as necessary and used to determine ore boundaries based on economic assumptions. To satisfy the disclosure rules in Industry Guide 7, the nominal cut-off grades used to calculate ore reserves are, generally: 0.2% zircon at Namakwa Sands; 1.5% ilmenite at KZN Sands; 1.3% THM (approximately 1% VHM) at our Northern Operations, Western Australia, 3% THM at our Southern Operations, Western Australia, and 1% THM at our Eastern Operations, Murray Basin, Australia. Actual cut-off grades applied in reserve estimates can vary according to numerous factors, such as mining method, overburden: ore ratios, and HM assemblage quality.

Heavy Mineral Reserves

Ore reserves are those portions of mineral deposits that are economically and legally exploitable at December 31, 2019. All of our heavy mineral reserves are reported on the basis of in-place, economically extractable ore, determined from comprehensive geological, mining, processing and economic models. Reserve classifications of *Proven* or *Probable* are based on the level of confidence in the reserve estimates.

The following table summarizes our heavy mineral ore reserves and their contained in situ THM and heavy mineral assemblages as of December 31, 2019. Increases or decreases in our reserves estimates from December 31, 2018 to December 31, 2019 are indicated as a percent of in-place THM reserves.

MINE / DEPOSIT	Reserve Category	Ore (million tonnes)	Average Grade (% THM)	In-Place THM (million tonnes)	VHM Assemblage (% of THM)			Change from 2018 + (-) %
					Ilmenite	Rutile and Leucoxene	Zircon	
Namakwa Sands Dry Mine - Western Cape RSA								
	Proven	159	8.2%	13.0	37.3	8.2	9.0	
	Probable	<u>589</u>	<u>5.5%</u>	<u>32.5</u>	<u>52.5</u>	<u>10.9</u>	<u>11.2</u>	
	Total Reserves	<u>748</u>	<u>6.1%</u>	<u>45.6</u>	<u>48.1</u>	<u>10.2</u>	<u>10.5</u>	11.3%
KZN Sands Hydraulic Mine KwaZulu-Natal RSA								
	Proven	221	5.8%	12.7	61.8	7.3	7.8	
	Probable	<u>12</u>	<u>4.5%</u>	<u>0.5</u>	<u>54.9</u>	<u>5.3</u>	<u>7.3</u>	
	Total Reserves	<u>233</u>	<u>5.7%</u>	<u>13.2</u>	<u>61.7</u>	<u>7.2</u>	<u>7.7</u>	(6.2)%
Cooljarloo – Dredge Mine Western Australia								
	Proven	258	1.7%	4.4	61.2	7.7	10.3	
	Probable	<u>158</u>	<u>2.0%</u>	<u>3.1</u>	<u>60.3</u>	<u>8.1</u>	<u>11.7</u>	
	Total Reserves	416	1.8%	7.5	60.8	7.9	10.9	(5.0)%
Dongara Planned Dry Mine Western Australia								
	Proven	68	5.1%	3.4	49.5	8.9	10.9	
	Probable	<u>—</u>	<u>—%</u>	<u>0.0</u>	<u>—</u>	<u>—</u>	<u>—</u>	
	Total Reserves	<u>68</u>	<u>5.1%</u>	<u>3.4</u>	<u>49.5</u>	<u>8.9</u>	<u>10.9</u>	6.3%
Northern Operations								
	Total Reserves	<u>484</u>	<u>2.3%</u>	<u>10.9</u>	<u>57.3</u>	<u>8.2</u>	<u>10.9</u>	(0.9)%
Wonnerup Dry Mine Western Australia								
	Proven	18	5.3%	1.0	68.7	19.7	10.0	
	Probable	<u>3</u>	<u>6.1%</u>	<u>0.2</u>	<u>87.1</u>	<u>3.1</u>	<u>7.5</u>	
	Total Reserves	<u>21</u>	<u>5.5%</u>	<u>1.2</u>	<u>71.8</u>	<u>16.9</u>	<u>9.6</u>	N/A
Southern Operations								
	Total Reserves	21	5.5%	1.2	71.8	16.9	9.6	N/A
Ginkgo-Crayfish-Snapper Dredge/ Dry Mines, New South Wales Australia								
	Proven	52	2.1%	1.1	40.7	29.0	12.3	
	Probable	<u>22</u>	<u>2.0%</u>	<u>0.4</u>	<u>44.0</u>	<u>27.8</u>	<u>11.8</u>	
	Total Reserves	<u>74</u>	<u>2.1%</u>	<u>1.5</u>	<u>41.7</u>	<u>28.6</u>	<u>12.1</u>	N/A
Atlas-Campaspe Projects, New South Wales Australia								
	Proven	<u>—</u>	<u>—%</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	
	Probable	<u>88</u>	<u>6.5%</u>	<u>5.7</u>	<u>56.1</u>	<u>16.0</u>	<u>12.3</u>	
	Total Reserves	<u>88</u>	<u>6.5%</u>	<u>5.7</u>	<u>56.1</u>	<u>16.0</u>	<u>12.3</u>	N/A
Eastern Operations								
	Total Reserves	<u>162</u>	<u>4.5%</u>	<u>7.2</u>	<u>53.0</u>	<u>18.7</u>	<u>12.3</u>	N/A
Global								
	Total Reserves	<u>1,648</u>	<u>4.7%</u>	<u>78.1</u>	<u>52.5</u>	<u>10.3</u>	<u>10.2</u>	

Abbreviations, Definitions, and Notations

One metric tonne = 1.10231 short tons)

Ore Reserves —the portions of our inventories of mineralized material inclusive of dilution, determined to be economically and legally exploitable as of December 31, 2019, classified as either *Probable Reserves* or *Proven Reserves*, based on level of confidence.

THM — total heavy minerals, densities >2.85 g/cm³ regardless of commercial value

VHM — valuable heavy minerals, including Ilmenite, Rutile, Leucoxene & Zircon, reported as percentage of THM.

Change from 2018 — Increase (decrease) in percent change of in-place THM from 2018

Key Assumptions — economic viability is determined by techno-economic modeling constructed from geological, analytical and geotechnical databases, mining parameters, metallurgical recovery assumptions, pit optimizations, and economic assumptions based on current operating costs, foreign exchange rates, and projected product sales prices at time of production. Historical sales prices by themselves are unreliable predictors of future prices, and our revenue forecasts are based on multiple factors, including market research, existing private contracts, and external consultant opinions.

Our forecast production of commercial-quality titanium mineral and zircon concentrates from reserves is based on mining rates, the heavy mineral assemblage and grade distributions, our experience in valuable mineral recoveries, and other inputs to our techno-economic models. Mining recoveries are typically high but metallurgical recoveries vary widely as a function of mineral characteristics. Processing efficiencies are affected by many factors, including mineralogical diversity, grain size, morphology and surface coatings of the heavy minerals. To a practical extent, mineral separation technology is customized for each mining operation. Cumulative recovery factors for VHM in our mine feeds, inclusive of VHM concentration at the mine and production of mineral concentrates at the separation plant, are generally in the range of 60% to 90%. Reconciliation of actual vs. predicted recoveries are applied to our techno-economic models. Unrecovered VHM in certain dry mill tailings streams are stockpiled, but their hypothetical value is not considered in our revenue assumptions.

Mineral reserve estimates, life-of mine projections, and revenue assumptions are inherently forward-looking and subject to market conditions, uncertainties and unanticipated events beyond our control.

The following table compares the heavy mineral reserves reported for the three years ending December 31, 2019, 2018 and 2017:

3-Year Reserves (Mt In-Place THM)

	December 31,		
	2019	2018	2017
	(In millions of metric tonnes)		
Namakwa Sands	45.6	40.8	43.8
KZN Sands	<u>13.2</u>	<u>14.1</u>	<u>10.9</u>
Total South Africa	58.8	54.9	54.7
Northern Ops, W. Australia	10.9	11.2	11.1
Southern Ops, W. Australia	1.2	N/A	N/A
Eastern Ops, Murray Basin Australia	<u>7.2</u>	<u>N/A</u>	<u>N/A</u>
Total Australia	19.3	11.2	11.1
Total Tronox	78.1	66.1	65.8

The above three-year total heavy mineral reserves for the Tronox mineral sands operations are expressed as millions of metric tonnes of in-place THM for the years ended 2017 through 2019.

Item 3 Legal Proceedings

Information required by this item is incorporated herein by reference to the section captioned “Notes to Consolidated Financial Statements, Note 20 - Commitments and Contingencies” of this Form 10-K.

Item 4. Mine Safety Disclosures

None.

PART II

Item 5. Market for Registrant’s Common Equity, Related Shareholder Matters and Issuer Purchases of Equity Securities

Market for our Ordinary Shares

Our ordinary shares trade on the New York Stock Exchange under the symbol “TROX.”

Holder of Record

As of January 31, 2020, there were approximately 56 holders of record of ordinary shares. This does not include the shareholders that held shares of our ordinary shares in a nominee or “street-name” accounts through banks or broker-dealers. See Item 12, Security Ownership of Certain Beneficial Owners and Management and Related Shareholder Matters.

Item 6. Selected Financial Data

The following table sets forth selected historical financial data for the periods indicated. This information should be read in conjunction with our Consolidated Financial Statements (including the notes thereto) and our “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

	Year Ended December 31,				
	2019	2018	2017	2016	2015
Statement of Operations Data:					
Net sales	\$2,642	\$1,819	\$1,698	\$1,309	\$1,510
Income (loss) from operations	95	200	141	(53)	(199)
Income (loss) from continuing operations before income taxes	(88)	43	(87)	(264)	(349)
Net income (loss) from continuing operations	(102)	30	(93)	(139)	(372)
Net income (loss) from discontinued operations	5	—	(179)	79	55
Net income (loss)	(97)	30	(272)	(60)	(317)
Income attributable to noncontrolling interest	12	37	13	1	12
Net (loss) income attributable to Tronox Holdings plc	(109)	(7)	(285)	(61)	(329)
Basic and diluted loss per share from continuing operations	\$(0.81)	\$(0.06)	\$(0.89)	\$(1.20)	\$(3.31)
Basic and diluted (loss) income per share from discontinued operations ⁽¹⁾	\$ 0.03	\$ —	\$(1.50)	\$ 0.68	\$ 0.47
Balance Sheet Data:					
Working capital ⁽²⁾	\$1,371	\$2,244	\$2,286	\$ 614	\$ 654
Total assets	5,268	4,642	4,864	3,293	3,337
Total debt, net	3,026	3,161	3,147	3,054	3,076
Total equity	916	862	1,015	1,153	1,103
Supplemental Information:					
Depreciation, depletion and amortization expense	\$ 280	\$ 195	\$ 182	\$ 177	\$ 253
Cash provided by operating activities	412	170	165	84	69
Capital expenditures	198	117	91	86	165
Dividends per share	0.18	0.18	0.18	0.385	1.00

(1) For 2019, amount reflects the sale of the Cristal North American TiO₂ business. For 2017, amount reflects the sale of the Alkali business. See Note 6 of notes to consolidated financial statements for additional information.

(2) Working capital is defined as the excess of current assets over current liabilities of continuing operations.

A number of items, shown below, impact the comparability of our income (loss) from operations and our Income (loss) from continuing operations before income taxes. The table below summarizes these items:

	<u>Year Ended December 31,</u>				
	<u>2019</u>	<u>2018</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>
Inventory step-up ⁽¹⁾	\$(98)	\$ —	\$ —	\$—	\$ —
Transaction costs ⁽²⁾	(32)	(66)	(48)	—	(36)
Impairment loss ⁽³⁾	—	(31)	—	—	—
Contract loss ⁽⁴⁾	(19)	—	—	—	—
Restructuring ⁽⁵⁾	(22)	—	1	(1)	(21)
Integration costs ⁽⁶⁾	(16)	—	—	—	—
Taxes other than income taxes ⁽⁷⁾	—	11	—	(5)	(6)
Pension and postretirement benefit curtailment and settlement gains ⁽⁸⁾	1	3	—	—	—
Share-based compensation modification ⁽⁹⁾	—	6	—	—	—
(Loss) gain on extinguishment of debt ⁽¹⁰⁾	(3)	(30)	(28)	4	—
Charge for capital gains tax payment to Exxaro ⁽¹¹⁾	(4)	—	—	—	—

- (1) During 2019, our operating income was impacted by a charge related to the recognition of a step-up in value of inventories as a result of purchase accounting.
- (2) During 2019, 2018 and 2017, our operating income was impacted by transaction costs incurred primarily associated with the Cristal Transaction. In 2015, our operating income was impacted by the transaction costs associated with the acquisition of the Alkali business.
- (3) During 2018, our operating income was impacted by the impairment loss on sale of the assets of our Tronox Electrolytic Operation.
- (4) During 2019, our operating income was impacted by estimated losses we expect to incur under the 8120 supply agreement with Venator.
- (5) During 2019, our operating income was impacted by employee-related costs associated with headcount reductions. In 2017, our operating income benefited from the reversal of restructuring expense pursuant to the settlement of claims previously filed relating to a prior restructure. During 2016 and 2015, our operating income was impacted by severance costs associated with the shutdown of our sodium chlorate plant and other global TiO₂ restructuring efforts.
- (6) During 2019, our operating income was impacted by integration costs associated with the acquisition of Cristal.
- (7) During 2018, our operating income benefited from reversal of accruals for non-income related taxes as a result of a settlement. These accruals negatively impacted our operating results in 2016 and 2015.
- (8) During 2019, our operating income was impacted by a settlement gain related to the Cristal US Pension Plan, Cristal Australia Defined Benefit Plan, and Cristal US TERP. In 2018, our Income (loss) from continuing operations before income taxes was impacted by a settlement gain related to the former U.S. postretirement medical plan.
- (9) During 2018, our operating income benefited from the reversal of previously recorded expense related to the modification of the Integration Incentive Award.
- (10) During 2019, our Income (loss) from continuing operations before income taxes was impacted by the loss in connection with the acceleration of the remaining deferred financing costs related to the modification to our Wells Fargo Revolver and the termination of the ABSA Revolver as well as the voluntary prepayment on the Term Loan Facility made in December 2019. During 2018, our Income (loss) from continuing operations before income taxes was impacted by the loss in connection with the redemption of senior notes, including a call premium of \$22 million. In 2017, our operating income was negatively impacted by the loss associated with the redemption of the outstanding balance of senior notes, repayment of a revolver, and debt issuance costs from the refinancing activities associated with the term loans. During 2016, our operating income benefited from the gain associated with the repurchase of \$20 million face value of senior notes.
- (11) During 2019, our operating income was impacted by the payment to be made to Exxaro for capital gains tax on disposal of its ordinary shares in Tronox Holdings plc included. The amount was subsequently paid in January 2020.

In addition to the items impacting Income (loss) from operations and Income (loss) from continuing operations identified above, net income (loss) from continuing operations was impacted by the following:

- In 2018, we recorded (i) a \$48 million tax benefit for the reversal of a tax valuation allowance attributable to our operating subsidiary in the Netherlands, (ii) a \$11 million tax expense for the settlement of prior year tax returns with a foreign tax authority, and (iii) a \$6 million tax expense for the impact on deferred tax assets from a change in tax rates in the Netherlands.
- In 2016, we recorded a tax benefit of \$107 million related to a corporate restructuring plan to simplify our corporate structure.

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

The following discussion should be read in conjunction with Tronox Holdings plc's consolidated financial statements and the related notes included elsewhere in this Annual Report on Form 10-K. This discussion and other sections in this Annual Report on Form 10-K contain forward-looking statements, within the meaning of the Private Securities Litigation Reform Act of 1995, that involve risks and uncertainties, and actual results could differ materially from those discussed in the forward-looking statements as a result of numerous factors. Forward-looking statements provide current expectations of future events based on certain assumptions and include any statement that does not directly relate to any historical or current fact. Forward-looking statements also can be identified by words such as "future," "anticipates," "believes," "estimates," "expects," "intends," "plans," "predicts," "will," "would," "could," "can," "may," and similar terms. There are important factors that could cause our actual results, level of activity, performance or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements. In particular, you should consider the numerous risks and uncertainties outlined in Item 1A. "Risk Factors."

This Management's Discussion and Analysis of Financial Condition and Results of Operations contains certain financial measures, in particular the presentation of earnings before interest, taxes, depreciation and amortization ("EBITDA") and Adjusted EBITDA, which are not presented in accordance with accounting principles generally accepted in the United States ("U.S. GAAP"). We are presenting these non-U.S. GAAP financial measures because we believe they provide us and readers of this Form 10-K with additional insight into our operational performance relative to earlier periods and relative to our competitors. We do not intend for these non-U.S. GAAP financial measures to be a substitute for any U.S. GAAP financial information. Readers of these statements should use these non-U.S. GAAP financial measures only in conjunction with the comparable U.S. GAAP financial measures. A reconciliation of net income (loss) to EBITDA and Adjusted EBITDA is also provided herein.

Executive Overview

On April 10, 2019, we announced the completion of the acquisition of the TiO₂ business of The National Titanium Dioxide Company Ltd. ("Cristal"), a limited company organized under the laws of the Kingdom of Saudi Arabia the ("Cristal Transaction"). The total acquisition price, including the value of the ordinary shares at \$14 per share on the date of the acquisition, is approximately \$2.2 billion. Following the Cristal Transaction, our production capacity is approximately 800,000 metric tons for titanium feedstock, approximately 294,000 metric tons for zircon and approximately 220,000 metric tons for pig iron. In addition, our annual production capacity is approximately 1,078,000 metric tons for TiO₂.

As a result of closing the Cristal Transaction, we now operate titanium-bearing mineral sand mines and beneficiation and smelting operations in Australia, South Africa and Brazil to produce feedstock materials that can be processed into TiO₂ for pigment, high purity titanium chemicals, including titanium tetrachloride, and Ultrafine© titanium dioxide used in certain specialty applications. The mining, beneficiation and smelting of titanium bearing mineral sands creates meaningful quantities of zircon, which we also supply to customers around the world. It is our long-term strategic goal to be fully vertically integrated and consume all of our feedstock materials in our own TiO₂ pigment facilities in the United States, Australia, Brazil, UK, France, Netherlands, China and the Kingdom of Saudi Arabia ("KSA"). We believe that full vertical integration is the best way to achieve our ultimate goal of delivering low cost, high-quality pigment to our coatings and other TiO₂ customers throughout the world.

In order to obtain regulatory approval for the Cristal Transaction, the Federal Trade Commission ("FTC") required us to divest Cristal's North American TiO₂ business, which we sold to INEOS on May 1, 2019, for cash proceeds of \$701 million, net of transaction costs and a working capital adjustment. The operating results of Cristal's North American TiO₂ business, from the acquisition date to the date of divestiture, are included in a single caption entitled "Loss from discontinued operations, net of tax" in our Consolidated Statements of Operations.

In addition, in order to obtain regulatory approval by the European Commission, we divested the 8120 paper laminate grade, supplied from our Botlek facility in the Netherlands, to Venator Materials PLC ("Venator"). The divestiture was completed on April 26, 2019. Under the terms of the divestiture, we will supply the 8120 grade product to Venator under a supply agreement for an initial term of 2 years, and extendable up to 3 years, to allow for the transfer of the manufacturing of the 8120 grade to Venator. Total cash consideration is

8 million Euros, of which 1 million Euros was paid at the closing and the remaining 7 million Euros (approximately \$6.2 million at December 31, 2019 exchange rate) will be paid in equal installments during the second quarters of 2020 and 2021. As a result of consummating the sale, we recorded a loss of \$19 million during the second quarter of 2019.

The TiO₂ operations produce, market and sell TiO₂ and our TiO₂ facilities consume the vast majority of the titanium feedstock which is produced by our mining and processing operations. We believe that our vertical integration is a significant strategic advantage and distinguishes us from other TiO₂ producers with which we compete. TiO₂ pigment is used extensively in the manufacture of paint and other coatings, plastics and paper, and in a wide range of other applications. Moreover, it is a critical component of everyday consumer applications due to its superior ability to cover or mask other materials effectively and efficiently relative to alternative white pigments and extenders. TiO₂ is considered a quality of life product.

Exxaro Mineral Sands Transaction Completion Agreement

During 2018, we, certain of our subsidiaries and Exxaro entered into the Exxaro Mineral Sands Transaction Completion Agreement (the “Completion Agreement”). The Completion Agreement provides for the orderly sale of Exxaro’s remaining ownership interest in us, subject to market conditions, helped to facilitate the Re-domicile Transaction, as well as addressed several legacy issues related to our 2012 acquisition of Exxaro’s mineral sands business. Pursuant to the terms of the Completion Agreement, Tronox has covenanted to pay Exxaro an amount equal to any South African capital gains tax assessed on Exxaro in respect of any profit arising to it on a disposal of any of its ordinary shares in the newly formed Tronox U.K. entity subsequent to the completion date of the Re-domicile Transaction where such tax would not have been assessed but for the Re-domicile Transaction. Similarly, Exxaro has covenanted to pay Tronox an amount equal to any South African tax savings Exxaro may realize in certain situations from any tax relief that would not have arisen but for the Re-domicile Transaction.

Pursuant to the terms of the Completion Agreement, during the second quarter of 2019, Exxaro exercised their right under the agreement to sell 14 million shares to us for an aggregate purchase price of approximately \$200 million or \$14.32 per share, plus fees of approximately \$1 million. The share price was based upon a 5% discount to the 10 day volume weighted average price as of the day that Exxaro exercised their sale notice to us. Upon repurchase of the shares by the Company, the shares were cancelled. As a result of the sale of the 14 million shares on May 9, 2019, in accordance with the tax indemnity referred to above whereby Tronox covenanted to pay Exxaro an amount equal to any South African capital gains tax assessed on Exxaro in respect of any profit arising to it on a disposal of any of its ordinary shares, we recorded a liability of approximately \$4 million which is included in “Accrued liabilities” in our Consolidated Balance Sheets as of December 31, 2019. This amount was subsequently paid in January 2020.

Furthermore, pursuant to the Completion Agreement, the parties agreed to accelerate our purchase of Exxaro’s 26% membership interest in Tronox Sands LLP, a U.K. limited liability partnership (“Tronox Sands”). On February 15, 2019, we completed the redemption of Exxaro’s ownership interest in Tronox Sands for consideration of approximately ZAR 2.06 billion (or approximately \$148 million) in cash, which represented Exxaro’s indirect share of the loan accounts in our South African subsidiaries.

At December 31, 2019, Exxaro continues to own approximately 14.7 million shares of Tronox, or a 10.4% ownership interest, as well as their 26% ownership interest in our South African operating subsidiaries. At the present time we are unable to reasonably determine when and if Exxaro will sell its remaining shares in the foreseeable future, and as a result, we are not able to estimate what the capital gains tax impacts would be should Exxaro sell its remaining shares. See Note 24 for additional information.

Share Repurchases

On June 3, 2019, the Company’s Board of Directors authorized the repurchase of up to \$100 million of the Company’s stock. As of December 31, 2019, we had repurchased a total of 7,453,391 shares under the authorization at an average price of \$11.59 per share and at a cost of approximately \$87 million, including sales commissions and fees. We did not complete the full program given certain Section 382 restrictions related to our NOLs. Upon repurchase of the shares by the Company, the shares were cancelled.

Tronox Synergy Savings Program

On April 10, 2019, we completed the Cristal Transaction. During the second quarter of 2019, as part of our strategy for realizing value from the acquisition, we announced our goal of achieving approximately \$220 million in operating synergies by 2022. These synergies are expected to be realized from the following areas:

- a. operational enhancements through, among other things, technology exchange, optimization of feedstock cost at pigment plants and performance improvements at the Yanbu plant in Saudi Arabia;
- b. feedstock initiatives including, among other things, maximizing synthetic rutile and slag output, reduction in freight costs and the utilization of our diverse types of feedstock and vertically integrated global feedstock chain;
- c. supply chain savings from, among other things, volume purchasing discounts, reduced distribution costs, and optimization of our broad portfolio of TiO₂ grades; and
- d. reductions in selling, general and administrative expenses primarily from employee-related costs and indirect spend consolidation.

In connection with realizing the synergies described above, during the year ended December 31, 2019, we incurred restructuring costs of \$22 million for employee related costs, including severance. See Note 4 of notes to consolidated financial statements for further information on restructuring.

As of December 31, 2019, we delivered total synergies of \$89 million since closing the Cristal Transaction, of which \$47 million have been reflected in our EBITDA, \$22 million will be reflected in EBITDA in future quarters, and \$20 million are cash synergies not reflected in EBITDA. Based upon the results realized to date, we raised our synergy targets to \$190 million for 2020, \$275 million for 2021 and \$325 million for 2022.

Business Environment

The following discussion includes trends and factors that may affect future operating results:

Sales in the fourth quarter of 2019 increased primarily due to the impact of Cristal when compared to the prior year period. On a pro forma basis, including Cristal in both periods, sales decreased by 5% in the fourth quarter of 2019 compared to the fourth quarter of 2018 primarily driven by a decrease in zircon volumes and prices. Sequentially, revenues declined 10% in the fourth quarter compared to the third quarter of 2019 as a result of the expected seasonal decline in pigment volumes with slightly lower pigment prices and lower feedstock and other sales. Average TiO₂ selling prices were stable in the North American market but were down mid single digits versus the prior year in Europe, Asia, Middle East and Africa given weaker market conditions. TiO₂ pricing is expected to improve as demand recovers in late 2020. We continue to see softening in zircon demand primarily driven by global uncertainty of geopolitical tensions and a weaker Chinese economy.

On a pro forma basis, gross margin in the fourth quarter of 2019 was lower than the prior year quarter principally due to the decreases in selling prices and product mix and volumes as well as increases in production costs.

Pro Forma Income Statement Information

On April 10, 2019, we announced the completion of the acquisition of the TiO₂ business of Cristal which impacts the comparability of the reported results of 2019 compared to 2018 and the second quarter of 2019 compared to the first quarter of 2019. Since Tronox and Cristal have combined their respective businesses effective with the merger date of April 10, 2019, the year ended December 31, 2019 reflects the results of the combined business, while the year ended December 31, 2018 includes only the results of the legacy Tronox business. To assist with a discussion of the 2019 and 2018 results on a comparable basis, certain supplemental unaudited pro forma income statement information is provided on a consolidated basis and is referred to as “pro forma information”.

The pro forma information has been prepared on a basis consistent with Article 11 of Regulation S-X, assuming the merger and merger-related divestitures of Cristal’s North American TiO₂ business and the 8120 paper laminate grade had been consummated on January 1, 2018. In preparing this pro forma information, the historical financial information has been adjusted to give effect to pro forma adjustments that are (i) directly attributable to the business combination and other transactions presented herein, such as the merger-related divestitures, (ii) factually supportable, and (iii) expected to have a continuing impact on the combined entity’s

consolidated results. The pro forma information is based on management’s assumptions and is presented for illustrative purposes and does not purport to represent what the results of operations would actually have been if the business combination and merger-related divestitures had occurred as of the dates indicated or what the results would be for any future periods. Also, the pro forma information does not include the impact of any revenue, cost or other operation synergies in the periods prior to the acquisition that may result from the business combination or any related restructuring costs.

Consolidated Results of Operations from Continuing Operations

Year Ended December 31, 2019 Compared to the Year Ended December 31, 2018

	Reported Amounts			Pro Forma Amounts ⁽¹⁾		
	Year Ended December 31,			Year Ended December 31,		
	2019	2018	Variance	2019	2018	Variance
	(Millions of U.S. Dollars)			(Millions of U.S. Dollars)		
Net sales	\$2,642	\$1,819	\$ 823	\$3,008	\$3,339	\$ (331)
Cost of goods sold	2,159	1,321	838	2,364	2,519	(155)
Contract loss	<u>19</u>	<u>—</u>	<u>19</u>	<u>—</u>	<u>—</u>	<u>—</u>
Gross profit	464	498	(34)	644	820	(176)
Gross Margin	18%	27%	(9pts)	21%	25%	(4pts)
Selling, general and administrative expenses	347	267	80	354	354	—
Restructuring	22	—	22	22	1	21
Impairment loss	<u>—</u>	<u>31</u>	<u>(31)</u>	<u>—</u>	<u>31</u>	<u>(31)</u>
Income from operations	95	200	(105)	268	434	(166)
Interest expense	(201)	(193)	(8)	(207)	(211)	4
Interest income	18	33	(15)	12	13	(1)
Loss on extinguishment of debt	(3)	(30)	27	(3)	(30)	27
Other income (expense), net	<u>3</u>	<u>33</u>	<u>(30)</u>	<u>2</u>	<u>33</u>	<u>(31)</u>
Income (loss) from continuing operations before income taxes	(88)	43	(131)	72	239	(167)
Income tax provision	<u>(14)</u>	<u>(13)</u>	<u>(1)</u>	<u>(31)</u>	<u>(36)</u>	<u>5</u>
Net income (loss) from continuing operations	<u>\$ (102)</u>	<u>\$ 30</u>	<u>\$ (132)</u>	<u>\$ 41</u>	<u>\$ 203</u>	<u>\$ (162)</u>
Effective tax rate	<u>(16)%</u>	<u>30%</u>	<u>46pts</u>	<u>(43)%</u>	<u>(15)%</u>	<u>28pts</u>
EBITDA ⁽²⁾	<u>\$ 375</u>	<u>\$ 398</u>	<u>\$ (23)</u>	<u>\$ 590</u>	<u>\$ 771</u>	<u>\$ (181)</u>
Adjusted EBITDA ⁽²⁾	<u>\$ 615</u>	<u>\$ 513</u>	<u>\$ 102</u>	<u>\$ 681</u>	<u>\$ 923</u>	<u>\$ (242)</u>
Adjusted EBITDA as % of Net Sales	<u>23%</u>	<u>28%</u>	<u>(5pts)</u>	<u>23%</u>	<u>28%</u>	<u>(5pts)</u>

(1) The pro forma amounts have been prepared on a basis consistent with Article 11 of Regulation S-X. See “Supplemental Pro Forma Information” section of this MD&A for further detail.

(2) EBITDA and Adjusted EBITDA are Non-U.S. GAAP financials measures. Please refer to the “Non-U.S. GAAP Financial Measures” section of this Management’s Discussion and Analysis of Financial Condition and Results of Operations for a discussion of these measures and a reconciliation of these measures to Net income (loss) from continuing operations.

Reported net sales of \$2,642 million for the year ended December 31, 2019 increased by 45% compared to \$1,819 million for the same period in 2018. The year ended December 31, 2019 includes \$1,023 million or 56% revenue growth caused by the inclusion of the acquired operations of Cristal. Partially offsetting the increase from the Cristal Transaction was a reduction in overall sales volumes of TiO₂ and zircon and a decrease in average selling prices of TiO₂. Net sales by type of product for the years ended December 31, 2019 and 2018 were as follows:

The table below presents reported revenue by product:

<u>(Millions of dollars, except percentages)</u>	<u>Year Ended December 31,</u>		<u>Variance</u>	<u>Percentage</u>
	<u>2019</u>	<u>2018</u>		
TiO ₂	\$2,049	\$1,230	\$819	67%
Zircon	290	293	(3)	(1)%
Feedstock and other products.....	303	259	44	17%
Electrolytic	—	37	(37)	(100)%
Total net sales	<u>\$2,642</u>	<u>\$1,819</u>	<u>\$823</u>	<u>45%</u>

The table below presents pro forma revenue by product:

<u>(Millions of dollars, except percentages)</u>	<u>Year Ended December 31,</u>		<u>Variance</u>	<u>Percentage</u>
	<u>2019</u>	<u>2018</u>		
TiO ₂	\$2,374	\$2,590	\$(216)	(8)%
Zircon	310	406	(96)	(24)%
Feedstock and other products.....	324	306	18	6%
Electrolytic	—	37	(37)	(100)%
Total net sales	<u>\$3,008</u>	<u>\$3,339</u>	<u>\$(331)</u>	<u>(10)%</u>

On a reported basis, for the year ended December 31, 2019, TiO₂ revenue increased \$819 million, or 67%, compared to the prior year. The acquisition of Cristal contributed \$877 million or 71% to the growth. The increase in TiO₂ revenue from the Cristal Transaction was partially offset by \$16 million due to a 1% reduction in sales volumes, \$24 million due to a 4% decrease in average selling prices, and a \$4 million decline due to product mix in legacy Tronox operations. Foreign currency also contributed \$14 million to the TiO₂ revenue declines, due to the weakening Euro. Zircon revenues decreased \$3 million, or 1%, compared to the prior year despite the benefit of \$53 million of zircon revenue from Cristal's operations. The increase in zircon revenue from the Cristal Transaction was more than offset by a 23% reduction in sales volumes in legacy Tronox operations while average selling prices were 6% higher compared to the prior year. Feedstock and other product revenues increased \$44 million, or 17%, from the prior year. The increase in feedstock and other product revenue was driven by \$93 million of revenues from the acquired Cristal operations which was more than offset by a decrease in sales of rutile prime, pig iron, slag fines and ilmenite.

On a pro forma basis, for the year ended December 31, 2019, TiO₂ revenue was lower by \$216 million or 8% compared to the prior year driven by a 7% decrease in average selling prices impacting revenue by \$92 million, along with a \$4 million decrease in product mix and a 2% or \$56 million decrease in sales volumes. Foreign currency also contributed \$78 million to the TiO₂ revenue declines due to the weakening of the Euro. The zircon revenue declined \$96 million, or 24%, due to a 27% decrease in sales volumes partially offset by a 4% increase in average selling prices. Feedstock and other product revenue was higher by \$18 million, or 6%, compared to the prior year due to increases in CP slag sales volumes, partially offset by decreases in ilmenite sales.

On a reported basis, our gross margin of \$464 million for the year ended December 31, 2019 was 18% of net sales compared to 27% of net sales for the same period in 2018. The decrease in gross margin is primarily due to:

- the unfavorable impact of 4 points due to the value of the inventory of Cristal being stepped up to fair value on the acquisition date, which resulted in the recognition of higher expense of \$98 million in the current year period;

- the negative impact of \$76 million, or 3 points, due to higher costs of production primarily ore, process materials and energy. The current year cost includes an \$8 million benefit from the reclamation of the previously paid value added taxes in Brazil, which, on a comparative basis, offsets the benefit of a refund of \$9 million in the prior year for royalties paid to the South African Ministry of Finance of Mineral Extraction;
- the inclusion of Cristal's results, beyond the purchase accounting impact above, which operates at a lower gross margin than legacy Tronox, negatively impacting gross margin by 2 points;
- an unfavorable impact of 1 point due to volume and product mix; and
- the negative impact of \$19 million, or 1 point, on gross margin, of contract losses for the estimated losses we expect to incur on the 8120 supply agreement with Venator.

These decreases in the gross margin were partially offset by a 3 point favorable impact of foreign currency on cost of goods sold primarily driven by weakening of South African Rand and the Australian dollar.

On a proforma basis, our gross margin of \$644 million for the year ended December 31, 2019 was 21% of net sales compared to 25% of net sales for the same period in 2018. The decrease in gross margin is primarily due to:

- the unfavorable impact of 7 points due to production costs primarily caused by a legacy Cristal mine being nonoperational for much of 2019 and lower production volumes in our pigment facility in the Netherlands;
- the unfavorable impact of 2 points caused by a decrease in selling prices;
- the unfavorable impact of 1 point caused by volume and product mix, partially due to the lower zircon sales;
- the unfavorable impact of 1 point of foreign currency on sales due to the Euro.

These decreases in gross margin were partially offset by 4 points of favorable impact of foreign currency on cost of goods sold primarily driven by the weakening South African Rand and the Australian Dollar. In addition, there was a favorable impact of 3 points related to the value of inventory being stepped up to fair value on a pro forma basis during 2018, which did not recur.

On a reported basis, selling, general and administrative expenses increased by \$80 million, or 30%, for the year ended December 31, 2019 compared to the prior year. The acquisition of Cristal accounted for \$71 million of the increase. Offsetting the Cristal expenses, were \$38 million of lower professional fees primarily related to the Cristal Transaction in 2018 offset by an increase in integration costs of \$15 million, \$7 million of higher employee-related costs, higher agent commission expense of \$2 million, higher R&D expenses of \$5 million, and a \$14 million net increase in taxes other than income primarily related to the reversal of a tax accrual in the prior year related to a settlement. The increase in employee-related costs reflects a benefit to a prior modification to a performance-based restricted stock award and higher salaries and wages in the current year, partially offset by lower incentive compensation expenses.

On a pro forma basis, selling, general and administrative expenses remained relatively consistent year over year.

On both a reported and pro forma basis, we recorded restructuring expenses of \$22 million for employee-related costs associated with headcount reductions during the year ended December 31, 2019. See Note 4 of notes to consolidated financial statements.

Impairment losses of \$31 million for the year ended December 31, 2018 related to the charge for the impairment and loss on sale of the assets of our Tronox Electrolytic Operations. The Tronox Electrolytic Operations was sold on September 1, 2018. See Note 6 of notes to consolidated financial statements.

On a reported basis, income from operations for the year ended December 31, 2019 of \$95 million, decreased by \$105 million or 53% compared to the same period in 2018 which is primarily attributable to an increase of \$98 million in the stepped-up value of inventory resulting from purchase accounting which reduced gross margin, the \$19 million of contract losses arising from the Venator divestiture, and the \$22 million of restructuring expenses associated with headcount reductions as discussed above in the current year offset by the \$31 million of impairment losses recognized in 2018 of which there was no comparable amount in 2019.

On a pro forma basis, income from operations for the year ended December 31, 2019 was \$268 million, a decrease of \$166 million compared to \$434 million in the prior year due to the lower gross margin as well as the restructuring costs discussed above, partially offset by the recognition of the \$31 million impairment of our Electrolytic Operations in the prior year.

On both a reported basis and a proforma basis, adjusted EBITDA as a percentage of net sales was 23% for the year ended December 31, 2019, a decrease of 5 points from 28% in the prior year. Lower TiO₂ and zircon sales volumes, a decrease in TiO₂ sales prices and higher production costs were the primary drivers of the decrease, partially offset by the Cristal Transaction and favorable impacts related to foreign currency.

On a reported basis, interest expense for the year ended December 31, 2019 increased by \$8 million compared to the same period in 2018 primarily due to higher average interest rates driven by our borrowings in South Africa under the Standard Bank Term Loan Facility and interest expense related to outstanding debt balances incurred earlier in the year under our revolving credit agreements.

On a pro forma basis, interest expense for the year ended December 31, 2019 was slightly lower compared to the prior year period primarily due to lower average debt levels in the current year period versus the prior year period.

On a reported basis, interest income for the year ended December 31, 2019, decreased by \$15 million compared to the prior year primarily due to the interest income from the Blocked Term Loan that were included in restricted cash in the prior year, in anticipation of the closing of the Cristal Transaction.

On a pro forma basis, interest income for the year ended December 31, 2019 decreased by \$1 million compared to the same period in 2018 due to higher cash and cash equivalents and restricted cash balances in 2018 as a result of the anticipated Cristal Transaction.

Loss on extinguishment of debt of \$3 million for the year ended December 31, 2019 resulted from the modification to our Wells Fargo Revolver and the termination of the ABSA Revolver. Loss on extinguishment of debt for the year ended December 31, 2018 related to the redemption of our Senior Notes due 2022.

On a reported basis, other income (expense), net for the year ended December 31, 2019 primarily consisted of \$5 million net realized and unrealized foreign currency gains. Other income (expense), net for the year ended December 31, 2019 also includes an approximate \$2 million adjustment associated with a settlement gain related to the Cristal U.S. pension plan. On a reported basis, other income (expense), net for the year ended December 31, 2018 primarily consisted of \$29 million net realized and unrealized foreign currency gains in the current year period primarily driven by the weakening of the South African rand used in the remeasurement of our U.S. dollar denominated working capital balances. Other income (expense), net for the year ended December 31, 2018 also includes a \$3 million adjustment associated with a settlement gain related to our former U.S. postretirement medical plan. This amount had been deferred to Accumulated other comprehensive income. See Note 23 of notes to consolidated financial statements.

On a proforma basis, other income (expense), net for the year ended December 31, 2019 was lower than the prior year primarily due to the reasons previously discussed above.

The effective tax rate of (16)% and 30% for the years ended December 31, 2019 and 2018, respectively, differs from the U.K. statutory rate of 19% primarily due to changes to valuation allowances, disallowable expenditures, changes in prior year taxes, tax rate changes, and our jurisdictional mix of income at tax rates different than the U.K. statutory rate.

We continue to maintain full valuation allowances related to the total net deferred tax assets in the U.S. and Australia. For entities acquired in the Cristal Transaction, we have full valuation allowances in Australia, Brazil, Switzerland, and the U.S. The provisions for income taxes associated with these jurisdictions include no tax benefits with respect to losses incurred and tax expense only to the extent of current tax payments. Additionally, we have valuation allowances against other specific tax assets.

Additionally, during 2018, we reached a settlement agreement with the Australian Tax Office (ATO) for prior tax years which were under examination. The settlement with the ATO resulted in the accrual of an

\$11 million current tax provision (recorded in “Selling, general and administrative expenses” on the Consolidated Statement of Operations) which was paid to the ATO in December 2018. In 2018 we also recorded a charge of \$6 million to the tax provision for the impact on deferred tax assets from a change in tax rates in the Netherlands.

Discontinued Operations

Income from discontinued operations, net of tax was \$5 million for the year ended December 31, 2019 which was a result of the sale of Cristal’s North American TiO₂ business. There were no amounts recorded in discontinued operations for the year ended December 31, 2018. See note 6 of notes to consolidated financial statements for further discussion.

Year Ended December 31, 2018 Compared to the Year Ended December 31, 2017

A discussion of our results of operations for the year ended December 31, 2018 versus December 31, 2017 is included in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Results of Operation”, included in our Annual Report on Form 10-K/A for the year ended December 31, 2018.

Other Comprehensive Income (Loss)

Other comprehensive income was \$11 million for the year ended December 31, 2019 compared to other comprehensive loss of \$181 million for the year ended December 31, 2018. The income in 2019 compared to the loss in 2018 was primarily driven by the favorable year-over year foreign currency translation adjustments of \$196 million due to the movement in the South Africa rand.

A discussion of our comprehensive (loss) income for the year ended December 31, 2018 versus December 31, 2017 is included in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Other Comprehensive (Loss) Income”, included in our Annual Report on Form 10-K/A for the year ended December 31, 2018.

Liquidity and Capital Resources

During 2019, our liquidity decreased by \$635 million to \$648 million.

The table below presents our liquidity as of the following dates:

	<u>December 31, 2019</u>	<u>December 31, 2018</u>
Cash and cash equivalents	\$302	\$1,034
Available under the Wells Fargo Revolver	209	197
Available under the Standard Credit Facility	72	—
Available under the Emirates Revolver	46	—
Available under the SABB Facility	19	—
Available under the ABSA Revolver	—	52
Total	<u>\$648</u>	<u>\$1,283</u>

Historically, we have funded our operations and met our commitments through cash generated by operations, issuance of unsecured notes, bank financings and borrowings under lines of credit. In the next twelve months, we expect that our operations and available borrowings under our debt refinancing and revolving credit agreements (see Note 15 of notes to consolidated financial statements) will provide sufficient cash for our operating expenses, capital expenditures, interest payments and debt repayments. This is predicated on our achieving our forecast which could be negatively impacted by items outside of our control, in particular macroeconomic conditions. If negative events do occur, we may need to reduce our capital spend, cut back on operating costs, and other items within our control to maintain appropriate liquidity. Working capital (calculated as current assets less current liabilities) was \$1.4 billion at December 31, 2019, compared to \$2.2 billion at December 31, 2018. Working capital at December 31, 2018 included the Block Term Loan and related interest of \$650 million. The proceeds from the Blocked Term Loan was used in combination with a portion of unrestricted cash (noted in the table above) to fund the closing of the Cristal Transaction on

April 10, 2019. In the event of an asset sale, some or all of the net proceeds from the sale may be required to be used to prepay borrowings under the Term Loan Facility based on the ratio of the total combined debt outstanding under the Term Loan Facility and the Wells Fargo Revolver to the consolidated EBITDA, as defined in the Term Loan Facility, for the previous four quarters.

We completed the acquisition of Cristal on April 10, 2019 and on May 1, 2019, divested Cristal's North American operations for approximately \$701 million, net. Upon closing of the Cristal Transaction and subsequent sale of the Cristal North American operations, our senior net leverage ratio was below 2.75, and, as a result, the sale of the North American operations did not trigger a prepayment event. The proceeds received from the sale of Cristal's North American operations were used in part for the repurchase of the approximately 14 million shares from Exxaro on May 9, 2019 for an aggregate purchase price of approximately \$200 million, prepayment of \$195 million on our Term Loan Facility and repurchase of approximately 7.5 million shares for approximately \$87 million under our Board authorized plan. The balance of the remaining proceeds is expected to be used for general corporate purposes.

The liquidity table for December 31, 2018 does not include restricted cash of \$662 million related to the Blocked Term Loan and related interest. The Blocked Term Loan under the Term Loan Facility is included in Long-term debt, net.

As of and for the year ended December 31, 2019, the non-guarantor subsidiaries of our Senior Notes due 2025 represented approximately 19% of our total consolidated liabilities, approximately 36% of our total consolidated assets, approximately 35% of our total consolidated net sales and approximately 47% of our Consolidated EBITDA (as such term is defined in the 2025 Indenture). In addition, as of December 31, 2019, our non-guarantor subsidiaries had \$829 million of total consolidated liabilities (including trade payables but excluding intercompany liabilities), all of which would have been structurally senior to the 2025 Notes. See Note 15 of notes to consolidated financial statements for additional information.

At December 31, 2019, we had outstanding letters of credit and bank guarantees of \$73 million. See Note 15 of notes to consolidated financial statements.

Principal factors that could affect our ability to obtain cash from external sources include (i) debt covenants that limit our total borrowing capacity; (ii) increasing interest rates applicable to our floating rate debt; (iii) increasing demands from third parties for financial assurance or credit enhancement; (iv) credit rating downgrades, which could limit our access to additional debt; (v) a decrease in the market price of our common stock and debt obligations; and (vi) volatility in public debt and equity markets.

As of December 31, 2019, our credit rating with Moody's and Standard & Poor's was B1 positive outlook and B stable outlook, respectively.

Cash and Cash Equivalents

We consider all investments with original maturities of three months or less to be cash equivalents. As of December 31, 2019, our cash and cash equivalents were primarily invested in money market funds. We maintain cash and cash equivalents in bank deposit and money market accounts that may exceed federally insured limits. The financial institutions where our cash and cash equivalents are held are highly rated and geographically dispersed, and we have a policy to limit the amount of credit exposure with any one institution. We have not experienced any losses in such accounts and believe we are not exposed to significant credit risk.

The use of our cash includes payment of our operating expenses, capital expenditures, servicing our interest and debt repayment obligations, making pension contributions and making quarterly dividend payments.

Repatriation of Cash

At December 31, 2019, we held \$302 million in cash and cash equivalents in these respective jurisdictions: \$46 million in the United States, \$33 million in South Africa, \$66 million in Australia, \$49 million in Brazil, \$27 million in Saudi Arabia, \$28 million in China, and \$53 million in Europe. Our credit facilities limit transfers of funds from subsidiaries in the United States to certain foreign subsidiaries. In addition, at December 31, 2019, we held \$9 million of restricted cash primarily in Australia related to performance bonds.

Tronox Holdings plc has foreign subsidiaries with undistributed earnings at December 31, 2019. We have made no provision for deferred taxes related to these undistributed earnings because they are considered indefinitely reinvested in the foreign jurisdictions.

Cash Dividend on Ordinary Shares

On February 25, 2020, the Board declared a quarterly dividend of \$0.07 per share to holders of our ordinary shares at the close of business on March 9, 2020, which will be paid on March 20, 2020.

Debt Obligations

At both December 31, 2019 and December 31, 2018, we had no outstanding short-term borrowings under our Wells Fargo, Standard Bank and Emirates revolvers.

At December 31, 2019 and 2018, our long-term debt, net of unamortized discount and debt issuance costs was \$3.0 billion and \$3.2 billion, respectively.

At December 31, 2019 and 2018, our net debt (the excess of our debt over cash and cash equivalents) was \$2.7 billion and \$2.1 billion, respectively, excluding the \$9.0 million and \$662.0 million, respectively, of restricted cash related to the Blocked Term Loan. See Note 15 of notes to consolidated financial statements.

Cash Flows

Years Ended December 31, 2019 and 2018

The following table presents cash flow from continuing operations for the periods indicated:

	Year Ended December 31,	
	2019	2018
	(Millions of U.S. dollars)	
Net cash provided by operating activities	\$ 412	\$ 170
Net cash used in investing activities	(1,185)	(174)
Net cash used in financing activities	(638)	(46)
Net cash provided by discontinued operations	28	—
Effect of exchange rate changes on cash.	(2)	(23)
Net decrease in cash and cash equivalents	<u>\$(1,385)</u>	<u>\$ (73)</u>

Cash Flows provided by Operating Activities — Cash provided by our operating activities is driven by income related cash generation and changes in working capital. The following table summarizes our net cash provided by (used in) operating activities for 2019 and 2018:

	Year Ended December 31,	
	2019	2018
	(Millions of U.S. dollars)	
Net income (loss) from continuing operations	\$(102)	\$ 30
Net adjustments to reconcile net income (loss) to net cash provided by operating activities	<u>456</u>	<u>258</u>
Income related cash generation	354	288
Net change in assets and liabilities (“working capital changes”)	<u>58</u>	<u>(118)</u>
Net cash provided by our operating activities.	<u>\$ 412</u>	<u>\$ 170</u>

Net cash provided by operating activities increased by \$242 million as compared to the prior year primarily due to the inclusion of Cristal operations in 2019 and working capital initiatives. As a result of these working capital initiatives, we generated cash flows of \$118 million due to the timing of payments associated with accounts payable and accrued liabilities coupled with an increase in cash of \$89 million in enhanced collections on accounts receivable.

Cash Flows used in Investing Activities — Net cash used in investing activities for the year ended December 31, 2019 was \$1,185 million as compared to \$174 million for 2018. The increase was primarily driven by the cash paid of approximately \$1.7 billion for the acquisition of Cristal partially offset by the proceeds of \$701 million received from the sale of the Cristal North America business. In addition, capital expenditures of \$198 million in the current year increased compared to \$117 million in the prior year primarily related to

machinery and equipment upgrades and purchase of land caused by inclusion of Cristal in 2019. The current year also includes \$25 million for a loan to AMIC related to a titanium slag smelter facility (see Note 24 of notes to consolidated financial statements) as compared to \$64 million in the prior period. The prior year period also includes \$6 million in proceeds received from the sale of the Henderson Electrolytic Operations (see Note 6 of notes to consolidated financial statements).

Cash Flows (used in) provided by Financing Activities — Net cash used in financing activities during the year ended December 31, 2019 was \$638 million as compared to \$46 million for the year ended December 31, 2018. The cash used in financing activities during the year ended December 31, 2019 was primarily driven by repayments of long term debt of \$387 million versus proceeds of only \$222 million from debt, repurchases of common stock of \$288 million, the Company’s redemption of Exxaro’s 26% ownership interest in one of Tronox’s South African subsidiary (see Note 1 of notes to consolidated financial statements). The cash used in financing activities during 2018 was primarily due to the net proceeds from the issuance of our Senior Notes due 2026 (including payments for call premium and debt issuance costs) which was slightly more than the repayments of debt as the net proceeds were used to redeem the Senior Notes due 2022 as well as our scheduled debt repayments of \$22 million on our Term Loan Facility.

Years Ended December 31, 2018 and 2017

A discussion of our cash flows for the year ended December 31, 2018 versus December 31, 2017 is included in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Cash Flows”, included in our Annual Report on Form 10-K/A for the year ended December 31, 2018.

Contractual Obligations

The following table sets forth information relating to our contractual obligations as of December 31, 2019:

	Contractual Obligation Payments Due by Period⁽³⁾				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
	(Millions of U.S. dollars)				
Long-term debt and lease financing (including interest) ⁽¹⁾	\$3,933	\$208	\$421	\$2,152	\$1,152
Purchase obligations ⁽²⁾	486	214	111	81	80
Operating leases	117	44	60	5	8
Pension and other post-retirement benefit obligations ⁽⁴⁾	311	49	89	173	—
Asset retirement obligations ⁽⁵⁾	435	28	68	43	296
Total	<u>\$5,282</u>	<u>\$543</u>	<u>\$749</u>	<u>\$2,454</u>	<u>\$1,536</u>

(1) We calculated the Term Loan interest at a base rate of 2.2% plus a margin of 2.75%. See Note 15 of notes to our consolidated financial statements.

(2) Includes obligations to purchase requirements of process chemicals, supplies, utilities and services. We have various purchase commitments for materials, supplies, and services entered into in the ordinary course of business. Included in the purchase commitments table above are contracts, which require minimum volume purchases that extend beyond one year or are renewable annually and have been renewed for 2019. Certain contracts allow for changes in minimum required purchase volumes in the event of a temporary or permanent shutdown of a facility. We believe that all of our purchase obligations will be utilized in our normal operations.

(3) The table excludes contingent obligations, as well as any possible payments for uncertain tax positions given the inability to estimate the possible amounts and timing of any such payments.

(4) Pension and other post-retirement benefit (“OPEB”) obligations of \$311 million include estimates of pension plan contributions and expected future benefit payments for unfunded pension and OPEB plans. Pension plan contributions are forecasted for 2020 only. Expected future unfunded pension and OPEB benefit payments are forecasted only through 2029. Contribution and unfunded benefit payment estimates are based upon current valuation assumptions. Estimates of pension contributions after 2020 and unfunded benefit payments after 2029 are not included in the table because the timing of their resolution cannot be estimated. Refer to Note 23 in notes to consolidated financial statements for further discussion on our pension and OPEB plans.

(5) Asset retirement obligations are shown at the undiscounted and uninflated values.

Non-U.S. GAAP Financial Measures

EBITDA and Adjusted EBITDA, which are used by management to measure performance, are not presented in accordance with U.S. GAAP. We define EBITDA as net income (loss) excluding the impact of income taxes, interest expense, interest income and depreciation, depletion and amortization. We define Adjusted EBITDA as

EBITDA excluding the impact of nonrecurring items such as restructuring charges, gain or loss on debt extinguishments, impairment charges, gains or losses on sale of assets, acquisition-related transaction costs and pension settlements and curtailment gains or losses. Adjusted EBITDA also excludes non-cash items such as share-based compensation costs and pension and postretirement costs. Additionally, we exclude from Adjusted EBITDA, realized and unrealized foreign currency remeasurement gains and losses.

Management believes that EBITDA and Adjusted EBITDA is useful to investors, as it is commonly used in the industry as a means of evaluating operating performance. We do not intend for these non-U.S. GAAP financial measures to be a substitute for any U.S. GAAP financial information. Readers of these statements should use these non-U.S. GAAP financial measures only in conjunction with the comparable U.S. GAAP financial measures. Since other companies may calculate EBITDA and Adjusted EBITDA differently than we do, EBITDA and Adjusted EBITDA, as presented herein, may not be comparable to similarly titled measures reported by other companies. Management believes these non-U.S. GAAP financial measures:

- reflect our ongoing business in a manner that allows for meaningful period-to-period comparison and analysis of trends in our business, as they exclude income and expense that are not reflective of ongoing operating results;
- provide useful information in understanding and evaluating our operating results and comparing financial results across periods; and
- provide a normalized view of our operating performance by excluding items that are either noncash or infrequently occurring.

Adjusted EBITDA is one of the primary measures management uses for planning and budgeting processes, and to monitor and evaluate financial and operating results. In addition, Adjusted EBITDA is a factor in evaluating management's performance when determining incentive compensation.

The following table reconciles net income (loss) to EBITDA and Adjusted EBITDA for the periods presented:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
Net (loss) income, (U.S. GAAP)	\$ (97)	\$ 30	\$(272)
Income (loss) from discontinued operations, net of tax (see Note 6), (U.S. GAAP) . .	<u>5</u>	<u>—</u>	<u>(179)</u>
Net (loss) income from continuing operations, (U.S. GAAP)	(102)	30	(93)
Interest expense	201	193	188
Interest income	(18)	(33)	(10)
Income tax provision	14	13	6
Depreciation, depletion and amortization expense	<u>280</u>	<u>195</u>	<u>182</u>
EBITDA (non-U.S. GAAP)	375	398	273
Inventory step-up ^(a)	98	—	—
Impairment loss ^(b)	—	31	—
Contract loss ^(c)	19	—	—
Share-based compensation ^(d)	32	21	31
Transaction costs ^(e)	32	66	48
Restructuring ^(f)	22	—	(1)
Integration costs ^(g)	16	—	—
Loss on extinguishment of debt ^(h)	3	30	28
Foreign currency remeasurement ⁽ⁱ⁾	(6)	(28)	20
Pension settlement gain ^(j)	(1)	(3)	—
Charge for capital gains tax payment to Exxaro ^(k)	4	—	—
Reversal of accrual related to tax settlement ^(l)	—	(11)	—
Other items ^(m)	<u>21</u>	<u>9</u>	<u>16</u>
Adjusted EBITDA (non-U.S. GAAP)	<u>\$ 615</u>	<u>\$513</u>	<u>\$ 415</u>

(a) Represents a pre-tax charge related to the recognition of a step-up in value of inventories as a result of purchase accounting.

- (b) Represents a pre-tax charge for the impairment and loss on sale of the assets of our Tronox Electrolytic Operations which was recorded in “Impairment loss” in the Consolidated Statements of Operations. See Note 6 of notes to consolidated financial statements.
- (c) Represents a pre-tax charge for the estimated losses we expect to incur under the supply agreement with Venator. See Note 3 of notes to consolidated financial statements.
- (d) Represents non-cash share-based compensation. See Note 22 of notes to consolidated financial statements.
- (e) Represents transaction costs associated with the Cristal Transaction which were recorded in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.
- (f) Represents amounts for employee-related costs, including severance, which was recorded in “Restructuring” in the Consolidated Statements of Operations. See Note 4 of notes to consolidated financial statements.
- (g) Represents integration costs associated with the Cristal Transaction after the acquisition which were recorded in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.
- (h) 2019 amount represent the loss in connection with the modification of the Wells Fargo Revolver and termination of the ABSA Revolver and a voluntary prepayment made on the Term Loan Facility. See Note 15 of notes to consolidated financial statements. 2018 amount represents the \$30 million loss in connection with the redemption of senior notes, including a call premium of \$22 million. 2017 amount represents the \$28 million loss, which includes a \$22 million loss associated with the redemption of the outstanding balance of senior notes, \$1 million of unamortized original debt issuance costs from the repayment of a Revolver, and \$5 million of debt issuance costs from the refinancing activities associated with the term loans.
- (i) Represents realized and unrealized gains and losses associated with foreign currency remeasurement related to third-party and intercompany receivables and liabilities denominated in a currency other than the functional currency of the entity holding them, which are included in “Other income (expense), net” in the Consolidated Statements of Operations. Prior to the first quarter of 2019, realized gains and losses associated with third-party receivables and liabilities had been included in Adjusted EBITDA. Commencing with 2019, we are now excluding these amounts from Adjusted EBITDA and prior period amounts have been revised for comparability purposes. The exclusion of all of the realized and unrealized gains and losses is consistent with the reporting of Adjusted EBITDA we make to our lenders.
- (j) 2019 amount represents settlement gain related to the U.S. Pension Plan (acquired as part of the Cristal Transaction). 2018 amount represents settlement gain related to the former U.S. postretirement medical plan.
- (k) Represents the payment to Exxaro for capital gains tax on the disposal of its ordinary shares in Tronox Holdings plc included in “Other income (expense), net” in the Consolidated Statements of Operations.
- (l) Represents the reversal of an accrual as a result of a tax settlement.
- (m) Includes noncash pension and postretirement costs, accretion expense, severance expense, and other items included in “Selling general and administrative expenses” and “Cost of goods sold” in the Consolidated Statements of Operations.

The following table reconciles net income from continuing operations to Adjusted EBITDA on a pro forma basis for the periods presented (see footnotes under the as reported Adjusted EBITDA table for discussion of adjustments to derive Adjusted EBITDA):

	Year Ended December 31,	
	2019	2018
Net income from continuing operations (U.S. GAAP)	\$ 41	\$203
Interest expense	207	211
Interest income	(12)	(13)
Income tax provision	31	36
Depreciation, depletion and amortization expense	<u>323</u>	<u>334</u>
EBITDA (non-U.S. GAAP)	590	771
Inventory step-up	—	98
Impairment loss	—	31
Share-based compensation	32	21
Restructuring	22	1
Integration Costs	16	—
Loss on extinguishment of debt	3	30
Foreign currency remeasurement	(6)	(21)
Pension settlement gain	(1)	(3)
Charge for capital gains tax payment to Exxaro	4	—
Reversal of accrual related to tax settlement	—	(11)
Other items	<u>21</u>	<u>6</u>
Adjusted EBITDA (non-U.S. GAAP)	<u>\$681</u>	<u>\$923</u>

Critical Accounting Policies and Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make certain estimates and assumptions regarding matters that are inherently uncertain and that ultimately affect the reported amounts of assets, liabilities, revenues and expenses, and the disclosure of contingent assets and liabilities. The estimates and assumptions are based on management's experience and understanding of current facts and circumstances. These estimates may differ from actual results. Certain of our accounting policies are considered critical, as they are both important to reflect our financial position and results of operations and require significant or complex judgment on the part of management. The following is a summary of certain accounting policies considered critical by management.

Purchase Accounting

As discussed below, the assets acquired and liabilities assumed in the \$2.2 billion Cristal Transaction are measured at fair value as of the date of the acquisition on a preliminary basis and include management's best estimate of assumptions about future events and uncertainties. In determining the fair values, we utilized various forms of the income, cost and market approaches depending on the asset or liability being fair valued. These fair value estimates include judgments related to future cash flows (including sales, cost of sales, income taxes, etc.), discount rates, competitive trends, market comparables and other factors. Inputs used were generally determined from historical data supplemented by current and anticipated market conditions and growth rates. The mining discounted cash flow includes significant estimates and assumptions with respect to the expected production of the mine over the estimated time period, sales prices, profit margins and the discount rate. The estimates and assumptions used to determine the preliminary estimated fair values as well as asset lives, have a material impact to the company's consolidated financial statements, and are based upon assumptions believed to be reasonable but that are inherently uncertain.

Although the determination of the preliminary fair values of assets acquired and liabilities assumed are substantially complete, certain fair value estimates are based on preliminary information that are subject to change during the measurement period, which ends one year from the date of the acquisition. During the measurement period, when new information is obtained about facts and circumstances that existed as of the acquisition date that, if known, would have resulted in revised estimated values of assets or liabilities assumed as of that date, we will revise the preliminary purchase price allocation and reflect the impact of any adjustments in the period in which the adjustments are determined. At December 31, 2019, the fair values that are based on preliminary information relate primarily to property, plant and equipment (including economic obsolescence), mineral leaseholds, contingent liabilities and certain noncurrent liabilities, and related impacts on deferred taxes and noncontrolling interest, if any. Refer to Notes 2 and 3 to the consolidated financial statements for additional information.

Asset Retirement Obligations

To the extent a legal obligation exists, an asset retirement obligation ("ARO") is recorded at its estimated fair value and accretion expense is recognized over time as the discounted liability is accreted to its expected settlement value. Because AROs represent financial obligations to be settled in the future, uncertainties exist in estimating the timing and amount of the associated costs to be incurred. Fair value is measured using expected future cash outflows, adjusted for expected inflation and discounted at our credit-adjusted risk-free interest rate. No market-risk premium has been included in our calculation of ARO balances since we can make no reliable estimate. Management believes these estimates and assumptions are reasonable; however, they are inherently uncertain. At December 31, 2019, AROs were \$158 million of which the long-term portion of \$142 million is recorded in "Asset retirement obligations" and the short-term portion of \$16 million is recorded in "Accrued liabilities" in the Consolidated Balance Sheet.

Environmental Matters

Liabilities for environmental matters are recognized when remedial efforts are probable and the costs can be reasonably estimated. Such liabilities are based on our best estimate of the undiscounted future costs required to complete the remedial work. The recorded liabilities are adjusted periodically as remediation efforts progress or as additional technical, regulatory or legal information becomes available. Given the uncertainties regarding the status of laws, regulations, enforcement policies, the impact of other potentially responsible parties, technology

and information related to individual sites, we do not believe it is possible to develop an estimate of the range or reasonably possible environmental loss in excess of our recorded liabilities. At December 31, 2019, environmental liabilities were \$65 million, primarily related to the Cristal Transaction (see Note 3 to the consolidated financial statements).

For further discussion, see Environmental Matters included elsewhere in this section entitled, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and Notes 2 and 20 to the consolidated financial statements.

Income Taxes

We have operations in several countries around the world and are subject to income and similar taxes in these countries. The estimation of the amounts of income tax involves the interpretation of complex tax laws and regulations and how foreign taxes affect domestic taxes, as well as the analysis of the realizability of deferred tax assets, tax audit findings and uncertain tax positions. Although we believe our tax accruals are adequate, differences may occur in the future, depending on the resolution of pending and new tax matters.

Deferred tax assets and liabilities are determined based on temporary differences between the financial reporting and tax bases of assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. A valuation allowance is provided against a deferred tax asset when it is more likely than not that all or some portion of the deferred tax asset will not be realized. We periodically assess the likelihood that we will be able to recover our deferred tax assets, and reflect any changes in our estimates in the valuation allowance, with a corresponding adjustment to earnings or other comprehensive income (loss) as appropriate. ASC 740, *Income Taxes*, requires that all available positive and negative evidence be weighted to determine whether a valuation allowance should be recorded.

The amount of income taxes we pay are subject to ongoing audits by federal, state and foreign tax authorities, which may result in proposed assessments. Our estimate for the potential outcome for any uncertain tax issue is highly judgmental. We assess our income tax positions, and record tax benefits for all years subject to examination based upon our evaluation of the facts, circumstances and information available at the reporting date. For those tax positions for which it is more likely than not that a tax benefit will be sustained, we record the amount that has a greater than 50% likelihood of being realized upon settlement with a taxing authority that has full knowledge of all relevant information. Interest and penalties are accrued as part of tax expense, where applicable. If we do not believe that it is more likely than not that a tax benefit will be sustained, no tax benefit is recognized.

See Notes 2 and 8 to the consolidated financial statements for additional information.

Contingencies

From time to time, we may be subject to lawsuits, investigations and disputes (some of which involve substantial amounts claimed) arising out of the conduct of our business, including matters relating to commercial transactions, prior acquisitions and divestitures including our acquisition of Cristal, employee benefit plans, intellectual property, and environmental, health and safety matters. We recognize a liability for any contingency that is probable of occurrence and reasonably estimable. We continually assess the likelihood of adverse judgments of outcomes in these matters, as well as potential ranges of possible losses (taking into consideration any insurance recoveries), based on a careful analysis of each matter with the assistance of outside legal counsel and, if applicable, other experts. Such contingencies are significant and the accounting requires considerable management judgments in analyzing each matter to assess the likely outcome and the need for establishing appropriate liabilities and providing adequate disclosures.

Refer to Notes 2 and 20 to the consolidated financial statements for additional information.

Long-Lived Assets

Key estimates related to long-lived assets (property, plant and equipment, mineral leaseholds, and intangible assets) include useful lives, recoverability of carrying values, and the existence of any asset retirement obligations. As a result of future decisions, such estimates could be significantly modified. The estimated useful lives of property, plant and equipment range from three to forty years, and depreciation is recognized on a straight-line basis. Useful lives are estimated based upon our historical experience, engineering estimates, and

industry information. These estimates include an assumption regarding periodic maintenance. Mineral leaseholds are depreciated over their useful lives as determined under the units of production method. Intangible assets with finite useful lives are amortized on the straight-line basis over their estimated useful lives. The amortization methods and remaining useful lives are reviewed quarterly.

We evaluate the recoverability of the carrying value of long-lived assets that are held and used whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Under such circumstances, we assess whether the projected undiscounted cash flows of our long-lived assets are sufficient to recover the carrying amount of the asset group being assessed. If the undiscounted projected cash flows are not sufficient, we calculate the impairment amount by discounting the projected cash flows using our weighted-average cost of capital. For assets that satisfy the criteria to be classified as held for sale, an impairment loss, if any, is recognized to the extent the carrying amount exceeds fair value, less cost to sell. The amount of the impairment of long-lived assets is written off against earnings in the period in which the impairment is determined.

Pension and Postretirement Benefits

We provide pension benefits for qualifying employees in the United States and internationally, with the largest in the United Kingdom. Because pension benefits represent financial obligations that will ultimately be settled in the future with employees who meet eligibility requirements, uncertainties exist in estimating the timing and amount of future payments, and significant estimates are required to calculate pension expense and liabilities relating to these plans. The company utilizes the services of independent actuaries, whose models are used to help facilitate these calculations. Several key assumptions are used in actuarial models to calculate pension expense and liability amounts recorded in the financial statements; the most significant variables in the models are the expected rate of return on plan assets, the discount rate, and the expected rate of compensation increase. Management believes the assumptions used in the actuarial calculations are reasonable, reflect the company's experience and expectations for the future and are within accepted practices in each of the respective geographic locations in which it operates. However, actual results in any given year often differ from actuarial assumptions due to economic events and different rates of retirement, mortality, and turnover. Refer to Notes 2 and 23 to the consolidated financial statements for a summary of the plan assumptions and additional information on our pension arrangements.

Expected Return on Plan Assets — In forming the assumption of the long-term rate of return on plan assets, we consider the expected earnings on funds already invested, earnings on contributions expected to be made in the current year, and earnings on reinvested returns. The long-term rate of return estimation methodology for the plans is based on a capital asset pricing model using historical data and a forecasted earnings model. An expected return on plan assets analysis is performed which incorporates the current portfolio allocation, historical asset-class returns, and an assessment of expected future performance using asset-class risk factors. A 100 basis point change in these expected long-term rates of return, with all other variables held constant, would change our pension expense by approximately \$4 million.

Discount Rate — The discount rates selected for estimation of the actuarial present value of the benefit obligations are determined based on the prevailing market rate for high-quality, fixed-income debt instruments with maturities corresponding to the expected timing of benefit payments as of the annual measurement date for each of the various plans. These rates change from year to year based on market conditions that affect corporate bond yields. A 100 basis points change in discount rates, with all other variables held constant, would decrease/increase our pension expense by approximately \$2 million. A 100 basis points reduction in discount rates would increase the PBO by approximately \$70 million whereas a 100 basis point increase in discount rates would have a favorable impact to the PBO of approximately \$60 million.

Rates of Compensation Increase - We determine these rates based on review of the underlying long-term salary increase trend characteristic of the local labor markets and historical experience, as well as comparison to peer companies. A 100 basis points change in the expected rate of compensation increase, with all other variables held constant, would change our pension expense by approximately \$1 million and would impact the PBO by approximately \$6 million.

Recent Accounting Pronouncements

See Note 2 of notes to Consolidated Financial Statements for recently issued accounting pronouncements.

Environmental Matters

We are subject to a broad array of international, federal, state, and local laws and regulations relating to safety, pollution, protection of the environment, and the generation, storage, handling, transportation, treatment, disposal, and remediation of hazardous substances and waste materials. In the ordinary course of business, we are subject to frequent environmental inspections and monitoring, and occasional investigations by governmental enforcement authorities. Under these laws, we are or may be required to obtain or maintain permits or licenses in connection with our operations. In addition, under these laws, we are or may be required to remove or mitigate the effects on the environment of the disposal or release of chemical, petroleum, low-level radioactive and other substances at our facilities. We may incur future costs for capital improvements and general compliance under environmental, health, and safety laws, including costs to acquire, maintain, and repair pollution control equipment. Environmental laws and regulations are becoming increasingly stringent, and compliance costs are significant and will continue to be significant in the foreseeable future. There can be no assurance that such laws and regulations or any environmental law or regulation enacted in the future is not likely to have a material effect on our business. We believe we are in compliance with applicable environmental rules and regulations in all material respects.

Supplemental Pro Forma Information

To assist in the discussion of the 2019 and 2018 results on a comparable basis, certain supplemental unaudited pro forma income statement and adjusted EBITDA information is provided on a consolidated basis. The pro forma information has been prepared on a basis consistent with Article 11 of Regulation S-X, assuming the merger and merger-related divestitures of Cristal's North American TiO₂ business and the 8120 paper laminate grade had been consummated on January 1, 2018. The unaudited pro forma financial information reflects certain adjustments related to the acquisition, such as:

- (1) conforming the accounting policies of Cristal to those applied by Tronox;
- (2) conversion to U.S. GAAP from IFRS for Cristal;
- (3) the elimination of transactions between Tronox and Cristal;
- (4) recording certain incremental expenses resulting from purchase accounting adjustments, such as inventory step-up amortization, depreciation, depletion and amortization expense in connection with fair value adjustments to property, plant and equipment, mineral leases and intangibles assets;
- (5) recording the contract loss on the sale of the 8120 product line as a charge in the first quarter of 2018;
- (6) recording the effect on interest expense related to borrowings in connection with the Cristal Transaction; and
- (7) recording the related tax effects and impacts to EPS for the shares issued in conjunction with the transaction.

In preparing this pro forma information, the historical financial information has been adjusted to give effect to pro forma adjustments that are (i) directly attributable to the business combination and other transactions presented herein, such as the merger-related divestitures, (ii) factually supportable, and (iii) expected to have a continuing impact on the combined entity's consolidated results. The pro forma information is based on management's assumptions and is presented for illustrative purposes and does not purport to represent what the results of operations would actually have been if the business combination and merger-related divestitures had occurred as of the dates indicated or what the results would be for any future periods. Also, the pro forma information does not include the impact of any revenue, cost or other operating synergies that may result from the business combination or any related restructuring costs.

Events that are not expected to have a continuing impact on the combined results (nonrecurring income/charges) are excluded from the unaudited pro forma information.

The unaudited pro forma statement of operations and adjusted EBITDA have been presented for information purposes only and is not necessarily indicative of what Tronox's results actually would have been had the merger been completed on January 1, 2018. In addition, the unaudited pro forma information does not purport to project the future operating results of the Company.

The following unaudited pro forma information includes:

- Pro forma statement of operations for the year ended December 31, 2019 and 2018
- Pro forma Adjusted EBITDA for the year ended December 31, 2019 and 2018

TRONOX HOLDINGS PLC
Pro Forma Statement of Operations Information
For the Year Ended December 31, 2019
(Unaudited)
(Millions of U.S. dollars, except share and per share data)

	Tronox Holdings plc	Pro Forma Adjustments				Pro Forma
		Cristal (a)	Other	Total		
Net sales	\$ 2,642	\$379	\$(13) (b)	\$366		\$ 3,008
Cost of goods sold	2,159	294	(89) (c)	205		2,364
Contract loss	19	—	(19) (d)	(19)		—
Gross profit	464	85	95	180		644
Selling, general and administrative expenses	347	59	(52) (e)	7		354
Restructuring	22	—	—	—		22
Income from operations	95	26	147	173		268
Interest expense	(201)	(5)	(1) (f)	(6)		(207)
Interest income	18	—	(6) (g)	(6)		12
Loss on extinguishment of debt	(3)	—	—	—		(3)
Other income (expense), net	3	(1)	—	(1)		2
(Loss) income from continuing operations before income taxes	(88)	20	140	160		72
Income tax provision	(14)	(4)	(13)	(17)		(31)
(Loss) income from continuing operations	(102)	16	127	143		41
Net income attributable to noncontrolling interest	12	1	10 (h)	11		23
Net (loss) income from continuing operations attributable to Tronox Holdings plc	\$ (114)	\$ 15	\$117	\$132		\$ 18
Net (loss) income from continuing operations per share, basic	\$ (0.81)					\$ 0.12
Net (loss) income from continuing operations per share, diluted	\$ (0.81)					\$ 0.12
Weighted average shares outstanding, basic (in thousands) ..	139,859			(i)		150,051
Weighted average shares outstanding, diluted (in thousands)	139,859			(i)		151,153

TRONOX HOLDINGS PLC

Pro Forma Adjustments

- (a) Includes results from continuing operations for Cristal for the period of January 1, 2019 through April 9, 2019. The Cristal Transaction closed on April 10, 2019.
- (b) The adjustment to net sales includes \$11 million to eliminate sales between Tronox and Cristal and \$2 million to eliminate revenue associated with the divestiture of the 8120 paper laminate product grade.
- (c) The adjustment to cost of goods sold includes (i) a credit of \$11 million for the elimination of sales between Tronox and Cristal, (ii) a \$1 million for the decrease in depreciation and depletion expense as a result of fair value adjustments to property, plant and equipment and mineral leases, and (iii) a credit of \$98 million related to the amortizing of the step up in value of inventory. For pro forma purposes, the inventory step up was pushed back to 2018. Cost of goods sold also includes a reclassification of expenses of \$21 million from SG&A to cost of goods sold for distribution costs as part of our accounting policy alignment.

- (d) The adjustment is for the elimination of \$19 million in non-recurring contract losses incurred on the 8120 supply agreement with Venator.
- (e) The adjustment to SG&A includes the elimination of \$33 million in non-recurring acquisition-related transaction costs incurred, the reclassification of \$21 million in expenses from SG&A to cost of goods sold, and a \$2 million increase in amortization expense as a result of the fair value adjustment to intangible assets.
- (f) The adjustment to interest expense of \$1 million reflects interest incurred on incremental borrowings under the Wells Fargo Revolver used to close the Cristal Transaction.
- (g) The adjustment to interest income of \$6 million reflects the elimination of interest earned on cash balances that were used to acquire Cristal.
- (h) The adjustment to NCI of \$10 million reflects the component of the inventory step-up which is attributable to our non-controlling interest.
- (i) Represents an adjustment to reflect ordinary shares issued to Tasnee as part of the purchase price consideration.

TRONOX HOLDINGS PLC
Pro Forma Statement of Operations Information
For the Year Ended December 31, 2018
(Unaudited)

(Millions of U.S. dollars, except share and per share data)

	Tronox Holdings plc	Pro Forma Adjustments			Pro Forma
		Cristal (a)	Other	Total	
Net sales	\$ 1,819	\$1,607	\$ (87) (b)	\$1,520	\$ 3,339
Cost of goods sold	1,321	1,098	100 (c)	1,198	2,519
Gross profit	498	509	(187)	322	820
Selling, general and administrative expenses	267	252	(165) (d)	87	354
Restructuring	—	1	—	1	1
Impairment loss	31	—	—	—	31
Income (loss) from operations	200	256	(22)	234	434
Interest expense	(193)	(13)	(5) (e)	(18)	(211)
Interest income	33	—	(20) (f)	(20)	13
Loss on extinguishment of debt	(30)	—	—	—	(30)
Other income (expense), net	33	—	—	—	33
Income (loss) from continuing operations before income taxes	43	243	(47)	196	239
Income tax (provision) benefit	(13)	(27)	4	(23)	(36)
Income (loss) from continuing operations	30	216	(43)	173	203
Net income (loss) attributable to noncontrolling interest	37	9	(9) (g)	—	37
Net (loss) income from continuing operations attributable to Tronox Holdings plc	\$ (7)	\$ 207	\$ (34)	\$ 173	\$ 166
Net (loss) income from continuing operations per share, basic	\$ (0.06)				\$ 1.03
Net (loss) income from continuing operations per share, diluted	\$ (0.06)				\$ 1.02
Weighted average shares outstanding, basic (in thousands)	122,881		(h)		160,461
Weighted average shares outstanding, diluted (in thousands)	122,881		(h)		162,859

Pro Forma Adjustments

- (a) Includes results from continuing operations for Cristal for the period of January 1, 2018 through December 31, 2018.
- (b) The adjustment to net sales includes \$75 million to eliminate sales between Tronox and Cristal and \$12 million to eliminate revenue associated with the divestiture of the 8120 paper laminate product grade.
- (c) The adjustment to cost of goods sold includes (i) a credit of \$75 million for the elimination of sales between Tronox and Cristal, (2) \$5 million for the decrease in depreciation and depletion expense as a result of fair value adjustments to property, plant and equipment and mineral leases, (iii) a charge of \$98 million related to the recognition of a step-up in value of inventories, and (iv) a credit of \$1 million for the elimination of the cost for a licensing arrangement between Tronox and Cristal. Cost of goods sold also includes a reclassification of \$83 million from SG&A to cost of goods sold for distribution costs as part of our accounting policy alignment.

- (d) The adjustment to SG&A includes the elimination of \$87 million in non-recurring acquisition-related transaction costs incurred, the reclassification of \$83 million from SG&A to cost of goods sold and an increase of \$5 million in amortization expense related to the recognition of a step-up in value of intangible assets.
- (e) The adjustment to interest expense of \$5 million reflects interest incurred on incremental borrowings under the Wells Fargo Revolver used to close the Cristal acquisition.
- (f) The adjustment to interest income of \$20 million reflects the elimination of interest earned on cash balances that were used to acquire Cristal.
- (g) The adjustment to NCI of \$9 million reflects the \$10 million of the component of the inventory step-up which is attributable to the non-controlling interest and a decrease of \$1 million in the depreciation expense as a result of the fair value adjustments to property, plant and equipment which is also attributable to the non-controlling interest.
- (h) Represents an adjustment to reflect ordinary shares issued to Tasnee as part of the purchase price consideration.

TRONOX HOLDINGS PLC
Pro Forma Adjusted EBITDA Information
Year Ended December 31, 2019
(Millions of U.S. dollars)

	Tronox Holdings plc	Pro Forma Adjustments			Pro Forma
		Cristal (a)	Other	Total	
Net (loss) income from continuing operations					
(U.S. GAAP)	\$(102)	\$16	\$127	\$143	\$ 41
Interest expense	201	5	1	6	207
Interest income	(18)	—	6	6	(12)
Income tax provision	14	4	13	17	31
Depreciation, depletion and amortization expense.....	280	42	1	43	323
EBITDA (non-U.S. GAAP)	375	67	148	215	590
Inventory step-up	98	—	(98)	(98)	—
Contract loss	19	—	(19)	(19)	—
Share-based compensation	32	—	—	—	32
Transaction costs	32	1	(33)	(32)	—
Restructuring	22	—	—	—	22
Integration Costs	16	—	—	—	16
Loss on extinguishment of debt	3	—	—	—	3
Foreign currency remeasurement.....	(6)	—	—	—	(6)
Pension settlement gain	(1)	—	—	—	(1)
Charge for capital gains tax payment to Exxaro.....	4	—	—	—	4
Other items	21	—	—	—	21
Adjusted EBITDA (non-U.S. GAAP).....	<u>\$ 615</u>	<u>\$68</u>	<u>\$ (2)</u>	<u>\$ 66</u>	<u>\$681</u>

- (a) Includes results from continuing operations for Cristal for the period of January 1, 2019 through April 9, 2019. The acquisition closed on April 10, 2019.

TRONOX HOLDINGS PLC
Pro Forma Adjusted EBITDA Information
Year Ended December 31, 2018
(Millions of U.S. dollars)

	<u>Tronox Holdings plc</u>	<u>Pro Forma Adjustments</u>			<u>Pro Forma</u>
		<u>Cristal (a)</u>	<u>Other</u>	<u>Total</u>	
Net income (loss) from continuing operations (U.S. GAAP)	\$ 30	\$216	\$(43)	\$173	\$203
Interest expense	193	13	5	18	211
Interest income	(33)	—	20	20	(13)
Income tax provision (benefit)	13	27	(4)	23	36
Depreciation, depletion and amortization expense	<u>195</u>	<u>139</u>	<u>—</u>	<u>139</u>	<u>334</u>
EBITDA (non-U.S. GAAP)	398	395	(22)	373	771
Inventory step-up	—	—	98	98	98
Impairment loss	31	—	—	—	31
Share-based compensation	21	—	—	—	21
Transaction costs	66	21	(87)	(66)	—
Restructuring	—	1	—	1	1
Loss on extinguishment of debt	30	—	—	—	30
Foreign currency remeasurement	(28)	7	—	7	(21)
Pension settlement gain	(3)	—	—	—	(3)
Reversal of accrual related to tax settlement	(11)	—	—	—	(11)
Other items	<u>9</u>	<u>(3)</u>	<u>—</u>	<u>(3)</u>	<u>6</u>
Adjusted EBITDA (non-U.S. GAAP)	<u>\$513</u>	<u>\$421</u>	<u>\$(11)</u>	<u>\$410</u>	<u>\$923</u>

(a) Includes results from continuing operations for Cristal for the period of January 1, 2018 through December 31, 2018.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to various market, credit, operational, and liquidity risks in the normal course of business, which are discussed below. We manage these risks through normal operating and financing activities and, when appropriate, with derivative instruments. We do not invest in derivative instruments for speculative purposes, but historically have entered into, and may enter into, derivative instruments for hedging purposes in order to reduce the exposure to fluctuations in interest rates, natural gas prices and exchange rates.

Market Risk

A substantial portion of our products and raw materials are commodities that reprice as market supply and demand fundamentals change. Accordingly, product margins and the level of our profitability tend to vary with changes in the business cycle. Our TiO₂ prices may do so in the near term as ore prices and pigment prices are expected to fluctuate over the next few years. We try to protect against such instability through various business strategies. These include provisions in sales contracts allowing us to pass on higher raw material costs through timely price increases and formula price contracts to transfer or share commodity price risk, as well as using varying contract term lengths and selling to a diverse mix of customers by geography and industry to reap the benefits of a diverse portfolio.

Credit Risk

Credit risk is the risk that a borrower or a counterparty will fail to meet their obligations. A significant portion of our liquidity is concentrated in trade accounts receivable that arise from sales of our products to customers. In the case of TiO₂, the high level of industry concentration has the potential to impact our overall exposure to credit risk, either positively or negatively, in that our customers may be similarly affected by changes in economic, industry or other conditions. We have significant exposure to credit risk in industries that are affected by cyclical economic fluctuations. We perform ongoing credit evaluations of our customers from time to time, as deemed appropriate, to mitigate credit risk but generally do not require collateral. Our contracts typically enable us to tighten credit terms if we perceive additional credit risk; however, historic losses due to write offs of bad debt have been relatively low. In addition, due to our international operations, we are subject to potential trade restrictions and sovereign risk in certain countries in which we operate. We maintain allowances for potential credit losses based on specific customer review and current financial conditions. During 2019, 2018 and 2017, our ten largest third-party TiO₂ customers represented 31%, 37% and 35%, respectively, of our consolidated net sales. During 2019, 2018 and 2017, no single customer accounted for 10% of our consolidated net sales.

Interest Rate Risk

Interest rate risk arises from the possibility that changes in interest rates will impact our financial results. We are exposed to interest rate risk on our floating rate debt, the Term Loan Facility, Standard Bank Term Loan Facility, Tikon Loan and Wells Fargo, Standard Bank Revolver and Emirates Revolver balances. Using a sensitivity analysis as of December 31, 2019, a hypothetical 1% increase in interest rates would result in a net increase to pre-tax loss of approximately \$9 million on an annualized basis. This is due to the fact that earnings on our floating rate financial assets of \$310 million at December 31, 2019 would increase by the full 1%, offsetting the impact of a 1% increase in interest expense on our floating rate debt of \$1.2 billion.

Currency Risk

Currency risk arises from the possibility that fluctuations in foreign exchange rates will impact our balance sheets due to the translation of our assets and liabilities denominated in foreign currencies, as well as our earnings due to the translation of certain of our subsidiaries' statements of operations from local currencies to U.S. dollars, as well as due to remeasurement of assets and liabilities denominated in currencies other than a subsidiary's functional currency. We manufacture and market our products in a number of countries throughout the world and, as a result, are exposed to changes in foreign currency exchange rates, particularly in Australia, Brazil, China, South Africa, the Netherlands and the United Kingdom. The exposure is more prevalent in South Africa and Australia as the majority of revenues are earned in U.S. dollars while expenses are primarily incurred in local currencies. Since we are exposed to movements in the South African rand and the Australian Dollar versus the U.S. dollar, we may enter into forward contracts to buy and sell foreign currencies as "economic hedges" for these foreign currency transactions.

During 2019, we entered into foreign currency contracts used to hedge non-functional currency sales for our South African subsidiaries and forecasted non-functional currency cost of goods sold for our Australian subsidiaries. These foreign currency contracts are designated as cash flow hedges. Changes to the fair value of these foreign currency contracts are recorded as a component of other comprehensive income (loss) to the extent such contracts are effective, and are recognized in net sales or costs of goods sold in the period in which the forecasted transaction affects earnings or the transactions are no longer probable of occurring.

As of December 31, 2019, we had notional amounts of (i) 3.7 billion South African rands that expire between January 30, 2020 and February 25, 2021 to reduce the exposure of our South African subsidiaries' third party sales to fluctuations in currency rates, and (ii) 486 million Australian dollars that expire between January 30, 2020 and February 25, 2021 to reduce the exposure of our Australian subsidiaries' cost of sales to fluctuations in currency rates. At December 31, 2019, the unrealized net gain, net of tax, associated with these open contracts of approximately \$30 million is included in "Accumulated other comprehensive income (loss)" on the Consolidated Balance Sheet.

We enter into foreign currency contracts for the South African rand to reduce exposure of our foreign affiliates' balance sheet fluctuations in foreign currency rates. At December 31, 2019, the fair value of the foreign currency contracts was a gain of \$7 million.

Item 8. Financial Statements and Supplementary Data

	<u>Page No.</u>
Tronox Holdings Audited Annual Financial Statements	
Report of Independent Registered Public Accounting Firm	65
Consolidated Statements of Operations for the Years Ended December 31, 2019, 2018, and 2017	68
Consolidated Statements of Comprehensive Income (Loss) for the Years Ended December 31, 2019, 2018, and 2017.	69
Consolidated Balance Sheets at December 31, 2019 and 2018.	70
Consolidated Statements of Cash Flows for the Years Ended December 31, 2019, 2018, and 2017	71
Consolidated Statements of Changes in Shareholders' Equity for the Years Ended December 31, 2019, 2018, and 2017.	72
Notes to Consolidated Financial Statements.	73

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Tronox Holdings plc

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Tronox Holdings plc and its subsidiaries (the “Company”) as of December 31, 2019 and 2018, and the related consolidated statements of operations, comprehensive income (loss), changes in shareholders’ equity, and cash flows for each of the three years in the period ended December 31, 2019, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company’s internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control – Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Company’s management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management’s Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company’s consolidated financial statements and on the Company’s internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

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

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

As described in Management’s Report on Internal Control Over Financial Reporting, management has excluded the TiO₂ business of The National Titanium Dioxide Company Ltd. (“Cristal”) from its assessment of internal control over financial reporting as of December 31, 2019 because it was acquired by the Company in a purchase business combination during 2019. We have also excluded Cristal from our audit of internal control over financial reporting. Cristal is a wholly-owned subsidiary whose total assets and total revenues excluded from management’s assessment and our audit of internal control over financial reporting represent 38% and 39%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2019.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in

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

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

Critical Audit Matters

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

Acquisition of Cristal - Valuation of Mineral Leaseholds

As described in Note 3 to the consolidated financial statements, the Company completed the acquisition of Cristal in 2019 for a total acquisition price of \$2.2 billion, which primarily included net assets held for sale of \$722 million, working capital of \$770 million, property, plant and equipment of \$746 million, long-term liabilities of \$280 million and mineral leaseholds of \$95 million being recorded. The fair value of Cristal's mining operations in Australia was determined using the income approach, specifically a discounted cash flow analysis ("DCF"). The DCF includes significant estimates and assumptions with respect to the expected production of the mine over the estimated time period, sales prices, profit margins and the discount rate. As of December 31, 2019, the fair value of mineral leaseholds is based on preliminary information.

The principal considerations for our determination that performing procedures relating to the acquisition of Cristal - valuation of mineral leaseholds is a critical audit matter are there was significant judgment by management when developing the fair value measurement of the mineral leaseholds, which in turn led to a high degree of auditor judgment, subjectivity and effort in performing procedures to evaluate management's future cash flow projections and significant assumptions, including the expected production of the mine over the estimated time period, sales prices, profit margins and the discount rate. In addition, the audit effort involved the use of professionals with specialized skill and knowledge to assist in performing these procedures and evaluating the audit evidence obtained.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to acquisition accounting, including controls over management's valuation of the mineral leaseholds, and controls over development of the assumptions related to the valuation of mineral leaseholds, including the expected production of the mine over the estimated time period, sales prices, profit margins and the discount rate. These procedures also included, among others (i) reading the purchase agreement; (ii) testing management's process for estimating the fair value of mineral leaseholds; and (iii) testing management's cash flow projections used to estimate the mineral leaseholds, using professionals with specialized skill and knowledge to assist in doing so. Testing management's process included evaluating the appropriateness of the valuation methods and the reasonableness of significant assumptions, including the expected production of the mine over the estimated time period, sales prices, profit margins and the discount rate. Evaluating the reasonableness of the expected production of the mine over the estimated time period, sales prices, and profit margins included (i) comparing expected production of the mine and shipment volumes to geologist reports related to the ore reserve estimates; (ii) comparing sales prices to industry projections and other forecast information prepared by the Company; and (iii) comparing profit margins to information used by management to

support these inputs and assumptions, such as benchmarking data and comparisons to other similar operations within the Company to determine whether operating expenses were based on supportable costs. Professionals with specialized skill and knowledge were used to assist in evaluating the appropriateness of the Company's discounted cash flow model and the reasonableness of the discount rate.

/s/ PricewaterhouseCoopers LLP

Stamford, Connecticut

March 16, 2020

We have served as the Company's auditor since 2014.

TRONOX HOLDINGS PLC
CONSOLIDATED STATEMENTS OF OPERATIONS
(Millions of U.S. dollars, except share and per share data)

	Year Ended December 31,		
	2019	2018	2017
Net sales	\$ 2,642	\$ 1,819	\$ 1,698
Cost of goods sold	2,159	1,321	1,309
Contract loss	19	—	—
Gross profit	464	498	389
Selling, general and administrative expenses	347	267	249
Restructuring	22	—	(1)
Impairment loss	—	31	—
Income from operations	95	200	141
Interest expense	(201)	(193)	(188)
Interest income	18	33	10
Loss on extinguishment of debt	(3)	(30)	(28)
Other income (expense), net	3	33	(22)
(Loss) income from continuing operations before income taxes	(88)	43	(87)
Income tax provision	(14)	(13)	(6)
Net (loss) income from continuing operations	(102)	30	(93)
Net income (loss) from discontinued operations, net of tax	5	—	(179)
Net (loss) income	(97)	30	(272)
Net income attributable to noncontrolling interest	12	37	13
 Net loss attributable to Tronox Holdings plc	 \$ (109)	 \$ (7)	 \$ (285)
 Net (loss) income per share, basic and diluted:			
Continuing operations	\$ (0.81)	\$ (0.06)	\$ (0.89)
Discontinued operations	\$ 0.03	\$ —	\$ (1.50)
Net (loss) income per share, basic and diluted	\$ (0.78)	\$ (0.06)	\$ (2.39)
 Weighted average shares outstanding, basic and diluted			
(in thousands)	139,859	122,881	119,502

See notes to consolidated financial statements.

TRONOX HOLDINGS PLC
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(Millions of U.S. dollars)

	Year Ended December 31,		
	2019	2018	2017
Net (loss) income	\$ (97)	\$ 30	\$(272)
Other comprehensive income (loss):			
Foreign currency translation adjustments	19	(177)	125
Pension and postretirement plans (See Note 23):			
Actuarial losses, net of taxes of \$1 million in 2019, and less than \$1 million in both 2018, and 2017	(11)	(5)	(6)
Amortization of unrecognized actuarial losses, net of taxes of less than \$1 million in 2019, 2018, and 2017	2	3	3
Removal of Alkali qualified plan actuarial losses due to Sale	—	—	5
Settlement gain reclassified from accumulated other comprehensive loss to the Consolidated Statements of Operations (no tax impact)	<u>—</u>	<u>(3)</u>	<u>—</u>
Total pension and postretirement gains (losses)	(9)	(5)	2
Realized (gains) losses on derivative instruments reclassified from accumulated other comprehensive loss to the Consolidated Statements of Operations	(7)	—	—
Unrealized gains (losses) on derivative financial instruments, (net of taxes of \$5 million in 2019 and no tax impact in 2018 and 2017; See Note 16)	<u>8</u>	<u>1</u>	<u>(4)</u>
Other comprehensive income (loss)	<u>11</u>	<u>(181)</u>	<u>123</u>
Total comprehensive loss	<u>\$ (86)</u>	<u>\$(151)</u>	<u>\$(149)</u>
Comprehensive income (loss) attributable to noncontrolling interest:			
Net income	12	37	13
Foreign currency translation adjustments	<u>16</u>	<u>(44)</u>	<u>29</u>
Comprehensive income (loss) attributable to noncontrolling interest	<u>28</u>	<u>(7)</u>	<u>42</u>
Comprehensive (loss) income attributable to Tronox Holdings plc	<u><u>\$(114)</u></u>	<u><u>\$(144)</u></u>	<u><u>\$(191)</u></u>

See notes to consolidated financial statements.

TRONOX HOLDINGS PLC
CONSOLIDATED BALANCE SHEETS
(Millions of U.S. dollars, except share and per share data)

	December 31,	
	2019	2018
ASSETS		
Current Assets		
Cash and cash equivalents	\$ 302	\$1,034
Restricted cash	9	662
Accounts receivable (net of allowance of \$5 in 2019 and less than \$1 in 2018)	482	317
Inventories, net	1,131	479
Prepaid and other assets	143	50
Income taxes receivable	6	2
Total current assets	2,073	2,544
Noncurrent Assets		
Property, plant and equipment, net	1,762	1,004
Mineral leaseholds, net	852	796
Intangible assets, net	208	176
Lease right of use assets, net	101	—
Deferred tax assets	110	37
Other long-term assets	162	85
Total assets	\$5,268	\$4,642
 LIABILITIES AND EQUITY		
Current Liabilities		
Accounts payable	\$ 342	\$ 133
Accrued liabilities	283	140
Short-term lease liabilities	38	—
Long-term debt due within one year	38	22
Income taxes payable	1	5
Total current liabilities	702	300
Noncurrent Liabilities		
Long-term debt, net	2,988	3,139
Pension and postretirement healthcare benefits	160	93
Asset retirement obligations	142	68
Environmental liabilities	65	1
Long-term lease liabilities	62	—
Deferred tax liabilities	184	163
Other long-term liabilities	49	16
Total liabilities	4,352	3,780
 Commitments and Contingencies - Note 20		
Shareholders' Equity		
Tronox Holdings plc ordinary shares, par value \$0.01 — 141,900,459 shares issued and outstanding at December 31, 2019 and 123,015,301 shares issued and 122,933,845 shares outstanding at December 31, 2018.	1	1
Capital in excess of par value	1,846	1,579
Accumulated deficit	(493)	(357)
Accumulated other comprehensive loss	(606)	(540)
Total Tronox Holdings plc shareholders' equity	748	683
Noncontrolling interest	168	179
Total equity	916	862
Total liabilities and equity	\$5,268	\$4,642

See notes to consolidated financial statements.

TRONOX HOLDINGS PLC
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Millions of U.S. dollars)

	Year Ended December 31,		
	2019	2018	2017
Cash Flows from Operating Activities:			
Net (loss) income	\$ (97)	\$ 30	\$ (272)
Net income (loss) from discontinued operations, net of tax	5	—	(179)
	(102)	30	(93)
Net (loss) income from continuing operations			
Adjustments to reconcile net (loss) income from continuing operations to net cash provided by operating activities, continuing operations:			
Depreciation, depletion and amortization	280	195	182
Deferred income taxes	(9)	(21)	2
Share-based compensation expense	32	21	31
Amortization of deferred debt issuance costs and discount on debt	8	11	15
Loss on extinguishment of debt	3	30	28
Contract loss	19	—	—
Impairment loss	—	31	—
Acquired inventory step-up recognized in earnings	98	—	—
Other non-cash affecting net income (loss)	25	(9)	34
Changes in assets and liabilities:			
Decrease (increase) in accounts receivable, net	78	(11)	(50)
(Increase) decrease in inventories, net	(59)	(47)	57
(Increase) decrease in prepaid and other assets	20	4	(20)
Increase (decrease) in accounts payable and accrued liabilities	67	(51)	7
Net changes in income tax payables and receivables	(13)	10	(7)
Changes in other non-current assets and liabilities	(35)	(23)	(21)
	412	170	165
Cash provided by operating activities – continuing operations			
Cash Flows from Investing Activities:			
Capital expenditures	(198)	(117)	(91)
Cristal Acquisition	(1,675)	—	—
Proceeds from sale of Ashtabula	701	—	—
Insurance proceeds	10	—	—
Proceeds from sale of businesses	—	6	1,325
Loans	(25)	(64)	—
Proceeds from the sale of assets	2	1	—
	(1,185)	(174)	1,234
Cash (used in) provided by investing activities – continuing operations			
Cash Flows from Financing Activities:			
Repayments of short-term debt	—	—	(150)
Repayments of long-term debt	(387)	(606)	(2,342)
Proceeds from long-term debt	222	615	2,589
Repurchase of common stock	(288)	—	—
Acquisition of noncontrolling interest	(148)	—	—
Debt issuance costs	(4)	(10)	(37)
Call premium paid	—	(22)	(14)
Dividends paid	(27)	(23)	(23)
Restricted stock and performance-based shares settled in cash for taxes	(6)	(6)	(12)
Proceeds from the exercise of warrants and options	—	6	13
	(638)	(46)	24
Cash (used in) provided by financing activities – continuing operations			
Discontinued Operations:			
Cash provided by operating activities	29	—	107
Cash used in investing activities	(1)	—	(25)
	28	—	82
Net cash flows provided by discontinued operations			
	(2)	(23)	13
Effects of exchange rate changes on cash and cash equivalents and restricted cash			
	(1,385)	(73)	1,518
Net (decrease) increase in cash and cash equivalents and restricted cash			
Cash and cash equivalents and restricted cash at beginning of period	1,696	1,769	251
Cash and cash equivalents and restricted cash at end of period - continuing operations	\$ 311	\$1,696	\$ 1,769
Supplemental cash flow information - continuing operations:			
Interest paid, net	\$ 188	\$ 184	\$ 186
Income taxes paid	\$ 34	\$ 28	\$ 10

See notes to consolidated financial statements.

TRONOX HOLDINGS PC
CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY
(Millions of U.S. dollars)

	Tronox Holdings plc Ordinary Shares (in thousands)	Tronox Holdings plc Ordinary Shares (amount)	Capital in Excess of par Value	(Accumulated Deficit) Retained Earnings	Accumulated Other Comprehensive Loss	Total Tronox Limited Shareholders' Equity	Non- controlling Interest	Total Equity
Balance at January 1,								
2017	116,320	\$ 1	\$1,524	\$ (19)	\$(497)	\$1,009	\$ 144	\$1,153
Net (loss) income	—	—	—	(285)	—	(285)	13	(272)
Other comprehensive income	—	—	—	—	94	94	29	123
Shares-based compensation	3,049	—	33	—	—	33	—	33
Shares cancelled	(624)	—	(12)	—	—	(12)	—	(12)
Ordinary share dividends (\$0.045 per share)	—	—	—	(23)	—	(23)	—	(23)
Warrants and options exercised	<u>2,526</u>	<u>—</u>	<u>13</u>	<u>—</u>	<u>—</u>	<u>13</u>	<u>—</u>	<u>13</u>
Balance at December 31,								
2017	121,271	\$ 1	\$1,558	\$(327)	\$(403)	\$ 829	\$ 186	\$1,015
Net (loss) income	—	—	—	(7)	—	(7)	37	30
Other comprehensive income	—	—	—	—	(137)	(137)	(44)	(181)
Shares-based compensation	1,426	—	21	—	—	21	—	21
Shares cancelled	(316)	—	(6)	—	—	(6)	—	(6)
Warrants and options exercised	553	—	6	—	—	6	—	6
Ordinary share dividends (\$0.045 per share)	<u>—</u>	<u>—</u>	<u>—</u>	<u>(23)</u>	<u>—</u>	<u>(23)</u>	<u>—</u>	<u>(23)</u>
Balance at December 31,								
2018	122,934	\$ 1	\$1,579	\$(357)	\$(540)	\$ 683	\$ 179	\$ 862
Net (loss) income	—	—	—	(109)	—	(109)	12	(97)
Other comprehensive loss	—	—	—	—	(5)	(5)	16	11
Shares-based compensation	3,347	—	32	—	—	32	—	32
Shares issued for acquisition	37,580	—	526	—	—	526	—	526
Shares repurchased and cancelled	(21,453)	—	(288)	—	(288)	—	(288)	—
Shares cancelled	(508)	—	(6)	—	—	(6)	—	(6)
Acquisition of noncontrolling interest	—	—	3	—	(61)	(58)	(90)	(148)
Cristal acquisition	—	—	—	—	—	—	51	51
Ordinary share dividends (\$0.045 per share)	<u>—</u>	<u>—</u>	<u>—</u>	<u>(27)</u>	<u>—</u>	<u>(27)</u>	<u>—</u>	<u>(27)</u>
Balance at December 31,								
2019	<u>141,900</u>	<u>\$ 1</u>	<u>\$1,846</u>	<u>\$(493)</u>	<u>\$(606)</u>	<u>\$ 748</u>	<u>\$ 168</u>	<u>\$ 916</u>

See notes to consolidated financial statements.

TRONOX HOLDINGS PLC
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(Millions of U.S. dollars, except share, per share and metric tons data or unless otherwise noted)

1. The Company

Prior to March 27, 2019, Tronox Limited, a public limited company registered under the laws of the State of Western Australia, was the ultimate parent company of the Tronox group of companies. Effective March 27, 2019, Tronox Limited effected a redomiciliation transaction (the “Re-domicile Transaction”), effectively changing its jurisdiction of incorporation from Western Australia to England and Wales, by “top-hatting” the Tronox group of companies with Tronox Holdings plc (referred to herein as “Tronox,” “we,” “us,” or “our”), a public limited company registered under the laws of England and Wales. As a result of the Re-domicile Transaction, Tronox Limited became a wholly-owned subsidiary of Tronox Holdings plc. The Re-domicile Transaction was implemented by two schemes of arrangement, pursuant to which Tronox Limited’s Class A and Class B ordinary shares were exchanged on a one-for-one basis for ordinary shares in Tronox Holdings plc, par value US \$0.01 per share. As a result, the Class A ordinary shares of Tronox Limited were delisted from the New York Stock Exchange (“NYSE”) and the ordinary shares of Tronox Holdings plc were listed on the NYSE in its place. The Re-domicile Transaction had an impact on capital gains tax for our ordinary shares held by Exxaro Resources Limited (“Exxaro”). See “Exxaro Mineral Sands Transaction Completion Agreement” below for a discussion of our agreement with Exxaro associated with South African capital gains tax.

On April 10, 2019, we completed the acquisition from National Industrialization Company (“Tasnee”) of the TiO₂ business of The National Titanium Dioxide Company Ltd., a limited company organized under the laws of the Kingdom of Saudi Arabia (“Cristal”) (the “Cristal Transaction”). Including the Cristal operations, we now operate titanium-bearing mineral sand mines and beneficiation and smelting operations in Australia, South Africa and Brazil to produce feedstock materials that can be processed into TiO₂ for pigment, high purity titanium chemicals, including titanium tetrachloride, and Ultrafine© titanium dioxide used in certain specialty applications. It is our long-term strategic goal to be fully vertically integrated and consume all of our feedstock materials in our own TiO₂ pigment facilities in the United States, Australia, Brazil, UK, France, the Netherlands, China and the Kingdom of Saudi Arabia (“KSA”). We believe that full vertical integration is the best way to achieve our ultimate goal of delivering low cost, high-quality pigment to our coatings and other TiO₂ customers throughout the world. The mining, beneficiation and smelting of titanium bearing mineral sands creates meaningful quantities of zircon, which we also supply to customers around the world. See Note 3 below for further details on the Cristal Transaction.

In order to obtain regulatory approval for the Cristal Transaction, the Federal Trade Commission (“FTC”) required us to divest Cristal’s North American TiO₂ business, which we sold to INEOS on May 1, 2019, for cash proceeds of approximately \$701 million, net of transaction costs and working capital adjustment. The operating results of Cristal’s North American TiO₂ business, from the acquisition date to the date of divestiture, are included in a single caption entitled “Net Income (Loss) from discontinued operations, net of tax” in our Consolidated Statements of Operations. Refer to Note 3 and Note 6 for further details.

Exxaro Mineral Sands Transaction Completion Agreement

During 2018, we, certain of our subsidiaries and Exxaro entered into the Exxaro Mineral Sands Transaction Completion Agreement (the “Completion Agreement”). The Completion Agreement (i) provides for the orderly sale of Exxaro’s remaining ownership interest in us, subject to market conditions, (ii) helped to facilitate the Re-domicile Transaction, and (iii) addressed several legacy issues related to our 2012 acquisition of Exxaro’s mineral sands business. Pursuant to the terms of the Completion Agreement, Tronox has covenanted to pay Exxaro an amount equal to any South African capital gains tax assessed on Exxaro in respect of any profit arising to it on a disposal of any of its ordinary shares subsequent to the Re-domicile Transaction where such tax would not have been assessed but for the Re-domicile Transaction. Similarly, Exxaro has covenanted to pay Tronox an amount equal to any South African tax savings Exxaro may realize in certain situations from any tax relief that would not have arisen but for the Re-domicile Transaction.

Pursuant to the terms of the Completion Agreement, during the second quarter of 2019, we repurchased 14 million shares from Exxaro for an aggregate purchase price of approximately \$200 million or \$14.32 per share plus fees of approximately \$1 million. The share price was based upon a 5% discount to the 10 day

volume weighted average price as of the day that Exxaro exercised their sale notice to us. Upon repurchase of the shares by the Company, the shares were cancelled. As a result of the sale of the 14 million shares on May 9, 2019, in accordance with the tax indemnity referred to above whereby Tronox covenanted to pay Exxaro an amount equal to any South African capital gains tax assessed on Exxaro in respect to any profit arising to it on a disposal of any of its ordinary shares, we recorded a liability of approximately \$4 million which is included in “Accrued liabilities” in our Consolidated Balance Sheets as of December 31, 2019 and was fully paid in January 2020.

Furthermore, pursuant to the Completion Agreement, the parties agreed to accelerate our purchase of Exxaro’s 26% membership interest in Tronox Sands LLP, a U.K. limited liability partnership (“Tronox Sands”). On February 15, 2019, we completed the redemption of Exxaro’s ownership interest in Tronox Sands for consideration of approximately ZAR 2.06 billion (or approximately \$148 million) in cash, which represented Exxaro’s indirect share of the loan accounts in our South African subsidiaries.

At December 31, 2019, Exxaro continues to own approximately 14.7 million shares of Tronox, or a 10.4% ownership interest, as well as their 26% ownership interest in our South African operating subsidiaries. Under the terms of the Completion Agreement, Exxaro has the right to sell its ownership in Tronox at any time. At the present time we are unable to reasonably determine when and if Exxaro will sell its remaining shares in the foreseeable future, and as a result, we are not able to estimate what the capital gains tax impacts would be should Exxaro sell its remaining shares. See Note 24 for additional information.

Basis of Presentation

We are considered a domestic company in the United Kingdom and, as such, are required to comply with filing requirements in the United Kingdom. Additionally, we are not considered a “foreign private issuer” in the U.S.; therefore, we are required to comply with the reporting and other requirements imposed by the U.S. securities law on U.S. domestic issuers, which, among other things, requires reporting under accounting principles generally accepted in the United States of America (“U.S. GAAP”). The consolidated financial statements included in this Form 10-K are prepared in conformity with U.S. GAAP.

Our consolidated financial statements include the accounts of all majority-owned subsidiary companies. All intercompany balances and transactions have been eliminated in consolidation. Certain prior period amounts have been reclassified to conform to the manner and presentation in the current period.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting periods. It is at least reasonably possible that the effect on the financial statements of a change in estimate due to one or more future confirming events could have a material effect on the financial statements.

2. Significant Accounting Policies

Foreign Currency

The U.S. dollar is our reporting currency for our consolidated financial statements in both U.S. GAAP. We determine the functional currency of each subsidiary based on a number of factors, including the predominant currency for revenues, expenditures and borrowings. Adjustments from the remeasurement of non-functional currency monetary assets and liabilities are recorded in “Other income (expense), net” in the Consolidated Statements of Operations. When a subsidiary’s functional currency is not the U.S. dollar, translation adjustments resulting from translating the functional currency financial statements into U.S. dollar equivalents are recorded in “Accumulated other comprehensive loss” in the Consolidated Balance Sheets.

Translation adjustments on intercompany foreign currency receivables and payables that are not expected to be settled in the foreseeable future are reported in the same manner as translation adjustments.

Revenue Recognition

We recognize revenue at a point in time when the customer obtains control of the promised products. For most transactions this occurs when products are shipped from our manufacturing facilities or at a later point

when control of the products transfers to the customer at a specified destination or time. All amounts billed to a customer in a sales transaction related to shipping and handling represent revenues earned and are reported as “Net sales” in the Consolidated Statements of Operations. Accruals are made for sales returns, rebates and other allowances, which are recorded in “Net sales” in the Consolidated Statements of Operations, and are based on our historical experience and current business conditions. Additionally, we have elected the practical expedient to exclude sales taxes and similar taxes that we collect from customers on behalf of government authorities from the revenue transaction price. See Note 5.

Cost of Goods Sold

Cost of goods sold includes costs for purchasing, receiving, manufacturing, and distributing products, including raw materials, energy, labor, depreciation, depletion, shipping and handling, freight, warehousing, and other production costs.

Research and Development

Research and development costs, included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations comprised of salaries, building costs, utilities, administrative expenses, third party research, and allocations of corporate costs, were \$17 million, \$11 million, and \$8 million during 2019, 2018, and 2017, respectively, and were expensed as incurred.

Selling, General and Administrative Expenses

Selling, general and administrative expenses include costs related to marketing, research and development, agent commissions, and legal and administrative functions such as corporate management, human resources, information technology, investor relations, accounting, treasury, and tax compliance.

Income Taxes

We use the asset and liability method of accounting for income taxes. The estimation of the amounts of income taxes involves the interpretation of complex tax laws and regulations and how foreign taxes affect domestic taxes, as well as the analysis of the realizability of deferred tax assets, tax audit findings, and uncertain tax positions.

Deferred tax assets and liabilities are determined based on temporary differences between the financial reporting and tax bases of assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. A valuation allowance is provided against a deferred tax asset when it is more likely than not that all or some portion of the deferred tax asset will not be realized. We periodically assess the likelihood that we will be able to recover our deferred tax assets, and reflect any changes in our estimates in the valuation allowance, with a corresponding adjustment to earnings or other comprehensive income (loss), as appropriate. All available positive and negative evidence is weighted to determine whether a valuation allowance should be recorded.

The amount of income taxes we pay is subject to ongoing audits by federal, state, and foreign tax authorities, which may result in proposed assessments. Our estimate for the potential outcome for any uncertain tax issue is highly judgmental. We assess our income tax positions, and record tax benefits for all years subject to examination based upon our evaluation of the facts, circumstances, and information available at the reporting date. For those tax positions for which it is more likely than not that a tax benefit will be sustained, we record the amount that has a greater than 50% likelihood of being realized upon settlement with a taxing authority that has full knowledge of all relevant information. Interest and penalties are accrued as part of tax expense, where applicable. If we do not believe that it is more likely than not that a tax benefit will be sustained, no tax benefit is recognized. See Note 8.

Earnings per Share

Basic and diluted earnings per share are calculated using the two-class method. Under the two-class method, earnings used to determine basic earnings per share are reduced by an amount allocated to participating securities. Participating securities include restricted shares issued under the Tronox Management Equity Incentive Plan (the “MEIP”) (see Note 22), which contains non-forfeitable dividend rights. Our unexercised options and

unvested restricted share units do not contain non-forfeitable rights to dividends and, as such, are not considered in the calculation of basic earnings per share. Our unvested restricted shares do not have a contractual obligation to share in losses; therefore, when we record a net loss, none of the loss is allocated to participating securities. Consequently, in periods of net loss, the two-class method does not have an effect on basic loss per share.

Diluted earnings per share is calculated by dividing net earnings allocable to ordinary shares by the weighted-average number of ordinary shares outstanding for the period, as adjusted for the potential dilutive effect of non-participating restricted share units, options, and prior to February 2018 Series A and Series B Warrants. The options and Series A and Series B Warrants are included in the calculation of diluted earnings per ordinary share utilizing the treasury stock method. See Note 9.

Fair Value Measurement

We measure fair value on a recurring basis utilizing valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs, to the extent possible, and consider counterparty credit risk in our assessment of fair value. The fair value hierarchy is as follows:

- Level 1 – Quoted prices in active markets for identical assets and liabilities;
- Level 2 – Quoted prices for similar assets and liabilities in active markets, quoted prices for identical or similar assets and liabilities in markets that are not active or other inputs that are observable or can be corroborated by observable market data; and,
- Level 3 – Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets and liabilities See Note 17.

Cash and Cash Equivalents

We consider all investments with original maturities of three months or less to be cash equivalents. We maintain cash and cash equivalents in bank deposit and money market accounts that may exceed federally insured limits. The financial institutions where our cash and cash equivalents are held are generally highly rated and geographically dispersed, and we have a policy to limit the amount of credit exposure with any one institution. We have not experienced any losses in such accounts and believe we are not exposed to significant credit risk.

At December 31, 2019, we had restricted cash of \$9 million primarily in Australia related to outstanding performance bonds. At December 31, 2018, included in restricted cash was \$662 million related to our Blocked Term Loan (defined below). Upon consummation of the Cristal Transaction, the Blocked Term Loan became available to our subsidiary, Tronox Finance LLC. See Note 15.

Accounts Receivable, net of allowance for doubtful accounts

We perform credit evaluations of our customers, and take actions deemed appropriate to mitigate credit risk. Only in certain specific occasions do we require collateral in the form of bank or parent company guarantees or guarantee payments. We maintain allowances for potential credit losses based on specific customer review and current financial conditions.

Inventories, net

Pigment inventories are stated at the lower of actual cost and net realizable value, net of allowances for obsolete and slow-moving inventory. The cost of inventories is determined using the first-in, first-out method. Carrying values include material costs, labor, and associated indirect manufacturing expenses. Costs for materials and supplies, excluding titanium ore, are determined by average cost to acquire. Feedstock and co-products inventories including titanium ore are stated at the lower of the weighted-average cost of production or market. Inventory costs include those costs directly attributable to products, including all manufacturing overhead but excluding distribution costs. Raw materials are carried at actual cost.

We review the cost of our inventory in comparison to its net realizable value. We also periodically review our inventory for obsolescence. In either case, we record any write-down equal to the difference between the cost of inventory and its estimated net realizable value based on assumptions about alternative uses, market conditions and other factors. Inventories expected to be sold or consumed within twelve months after the balance sheet date are classified as current assets and all other inventories are classified as non-current assets. See Note 10.

Long Lived Assets

Property, plant and equipment, net is stated at cost less accumulated depreciation, and is depreciated over its estimated useful life using the straight-line method as follows:

Land improvements	10 — 20 years
Buildings	10 — 40 years
Machinery and equipment	3 — 25 years
Furniture and fixtures	10 years

Maintenance and repairs are expensed as incurred, except for costs of replacements or renewals that improve or extend the lives of existing properties, which are capitalized. Upon retirement or sale, the cost and related accumulated depreciation are removed from the respective account, and any resulting gain or loss is included in “Cost of goods sold” or “Selling, general, and administrative expenses” in the Consolidated Statements of Operations. See Note 11.

We capitalize interest costs on major projects that require an extended period of time to complete. See Note 15.

Mineral property acquisition costs are capitalized as tangible assets when management determines that probable future benefits consisting of a contribution to future cash inflows have been identified and adequate financial resources are available or are expected to be available as required to meet the terms of property acquisition and anticipated exploration and development expenditures. Mineral leaseholds are depleted over their useful lives as determined under the units of production method. Mineral property exploration costs are expensed as incurred. When it has been determined that a mineral property can be economically developed as a result of establishing proven and probable reserves, the costs incurred to develop such property through the commencement of production are capitalized. See Note 12.

Intangible assets are stated at cost less accumulated amortization, and are amortized on a straight-line basis over their estimated useful lives, which generally range from 3 to 20 years. See Note 13.

We evaluate the recoverability of the carrying value of long-lived assets that are held and used whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Under such circumstances, we assess whether the projected undiscounted cash flows of our long-lived assets are sufficient to recover the carrying amount of the asset group being assessed. If the undiscounted projected cash flows are not sufficient, we calculate the impairment amount by discounting the projected cash flows using our weighted-average cost of capital. For assets that satisfy the criteria to be classified as held for sale, an impairment loss, if any, is recognized to the extent the carrying amount exceeds fair value, less cost to sell. The amount of the impairment of long-lived assets is written off against earnings in the period in which the impairment is determined.

Business Acquisitions

Business acquisitions are accounted for using the acquisition method under Accounting Standards Codification (“ASC”) 805, *Business Combinations* (“ASC 805”), which requires recording assets acquired and liabilities assumed at fair value as of the acquisition date. Under the acquisition method of accounting, each tangible and separately identifiable intangible asset acquired and liabilities assumed is recorded based on their preliminary estimated fair values on the acquisition date. The initial valuations are derived from estimated fair value assessments and assumptions used by management. Acquisition related costs are expensed as incurred and are included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.

Leases

We determine if a contract is or contains a lease at inception of the contract. Our leases are primarily operating leases. Leased assets primarily include office buildings, rail cars and motor vehicles, forklifts, and other machinery and equipment. Our leases primarily have fixed lease payments, with real estate leases typically requiring additional payments for real estate taxes and occupancy-related costs. Certain of our leases also have variable lease payments. Variable lease payments that depend on an index or a rate (such as the Consumer Price Index) are included in our initial measurement of the lease right of use assets and lease liabilities. Variable lease payments that are not index or rate based (such as variable payments based on our

performance or use of the leased assets) are recorded as expenses when incurred and excluded from the measurement of right of use assets and lease liabilities. Our leases typically have initial lease terms ranging from 1 to 25 years. Some of our lease agreements include options to renew, extend or early terminate the leases. Lease term is the non-cancellable period of a lease, adjusted by the period covered by an option to extend or terminate the lease if we are reasonably certain to exercise (or not exercise) that option. Our operating leases typically do not contain purchase options we expect to exercise, residual value guarantees or other material covenants.

Operating leases are recorded under “Lease right of use assets”, “Short-term lease liabilities”, and “Long-term lease liabilities” on the Consolidated Balance Sheets. Finance leases are recorded under “Property, plant and equipment net”, “Long-term debt due within one year”, and “Long-term debt” on the Consolidated Balance Sheets. Operating lease right of use (“ROU”) assets and lease liabilities are initially recorded at the present value of the future minimum lease payments over the lease term at the commencement date or the acquisition date for leases acquired in the Cristal Transaction. 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 future payments. Lease payments for the initial measurement of lease ROU assets and lease liabilities include fixed payments and variable payments that depend on an index or a rate. Variable lease payments that are not index or rate based are recorded as expenses when incurred. Operating lease ROU assets are amortized on a straight-line basis over the period of the lease. Finance lease ROU assets are amortized on a straight-line basis over the shorter of their estimated useful lives of leased asset and the lease terms. See Note 18.

Long-term Debt

Long-term debt is stated net of unamortized original issue premium or discount. Premiums or discounts are amortized using the effective interest method with amortization expense recorded in “Interest and debt expense, net” in the Consolidated Statements of Operations. Deferred debt issuance costs related to a recognized debt liability are presented in the Consolidated Balance Sheets as a direct deduction from the carrying amount of that debt liability, consistent with debt discounts and are amortized using the effective interest method with amortization expense recorded in “Interest and debt expense, net” in the Consolidated Statements of Operations. See Note 15.

Asset Retirement Obligations

Asset retirement obligations are recorded at their estimated fair value, and accretion expense is recognized over time as the discounted liability is accreted to its expected settlement value. Fair value is measured using expected future cash outflows discounted at our credit-adjusted risk-free interest rate, which are considered Level 3 inputs. We classify accretion expense related to asset retirement obligations as a production cost, which is included in “Cost of goods sold” in the Consolidated Statements of Operations. See Note 19.

Environmental Remediation and Other Contingencies

We record an undiscounted liability when litigation has commenced or a claim or assessment has been asserted, or, based on available information, commencement of litigation or assertion of a claim or assessment is probable, and the associated costs can be reasonably estimated. See Note 20.

Self-Insurance

We are self-insured for certain levels of general and vehicle liability, property, workers’ compensation and health care coverage. The cost of these self-insurance programs is accrued based upon estimated fully developed settlements for known and anticipated claims. Any resulting adjustments to previously recorded reserves are reflected in current operating results. We do not accrue for general or unspecific business risks.

Share-based Compensation

Equity Restricted Share and Restricted Share Unit Awards — The fair value of equity instruments is measured based on the share price on the grant date and is recognized over the vesting period. These awards contain service, market, and/or performance conditions. For awards containing only a service or a market condition, we have elected to recognize compensation costs using the straight-line method over the requisite service period for the entire award. For awards containing a market condition, the fair value of the award is

measured using the Monte Carlo simulation under a lattice model approach. For awards containing a performance condition, the fair value is the grant date close price and compensation expense is not recognized until we conclude that it is probable that the performance condition will be met. We reassess the probability at least quarterly. See Note 22.

Option Awards — The Black-Scholes option pricing model is utilized to measure the fair value of options on the grant date. The options contain only service conditions, and have graded vesting provisions. We have elected to recognize compensation costs using the straight-line method over the requisite service period for the entire award. See Note 22.

Defined Benefit Pension and Postretirement Benefit Plans

We recognize the funded status of our defined benefit pension plans and postretirement benefit plans in the Consolidated Balance Sheet. The funded status is measured as the difference between the fair value of plan assets and the benefit obligation at the measurement date. The benefit obligation for the defined benefit plans is the projected benefit obligation (PBO), which represents the actuarial present value of benefits expected to be paid upon retirement based on employee services already rendered and estimated future compensation levels. The benefit obligation for our postretirement benefit plans is the accumulated postretirement benefit obligation (APBO), which represents the actuarial present value of postretirement benefits attributed to employee services already rendered. The fair value of plan assets related to our defined benefit plan represents the current market value of assets held in a trust fund, which is established for the sole benefit of plan participants.

If the fair value of plan assets exceeds the benefit obligation, the plan is overfunded, and the excess is recorded as a prepaid pension asset. On the other hand, if the benefit obligation exceeds the fair value of plan assets, the plan is underfunded, and the deficit is recorded as pension and postretirement healthcare benefits obligation in the Consolidated Balance Sheet. The portion of the pension and postretirement healthcare obligations payable within the next 12 months is recorded in accrued liabilities in the Consolidated Balance Sheet.

Net periodic pension and postretirement benefit cost represents the aggregation of service cost, interest cost, expected return on plan assets, amortization of prior service costs or credits and actuarial gains or losses previously recognized as a component of OCI and it is recorded in the Consolidated Statement of Operations. Net periodic cost is recorded in cost of goods sold and selling, general and administrative expenses in the Consolidated Statement of Operations based on the employees' respective functions.

Actuarial gains or losses represents the effect of remeasurement on the benefit obligation principally driven by changes in the plan actuarial assumptions. Prior service costs or credits arise from plan amendments. The actuarial gains or losses and prior service costs or credits are initially recognized as a component of Other Comprehensive income in the Consolidated Statement of Comprehensive Income (Loss). Those gains or losses and prior service costs or credits are subsequently recognized as a component of net periodic cost.

The measurement of benefit obligations and net periodic cost is based on estimates and assumptions approved by management. These valuations reflect the terms of the plans and use participant-specific information such as compensation, age and years of service, as well as certain assumptions, including estimates of discount rates, expected return on plan assets, rate of compensation increases and mortality rates.

Defined Contribution Plans — We recognize our contribution as expense when they are due. The expense is recorded in cost of goods sold or selling, general and administrative expenses the Consolidated Statement of Operations based on the employees' respective functions.

Multiemployer Plan — We treat our multiemployer plan like a defined contribution plan. A pension plan to which two or more unrelated employers contribute is generally considered to be a multiemployer plan. As a defined contribution plan, we recognize the contribution for the period as a net benefit cost and any contributions due and unpaid as a liability.

Recently Adopted Accounting Pronouncements

In February 2016, the Financial Standards Accounting Board ("FASB") issued ASU 2016-02, *Leases* ("ASU 2016-02") which includes a lessee accounting model that recognizes two types of leases - finance leases and operating leases. The new standard requires a lessee to recognize on the balance sheet, for all leases of more

than 12 months, a lease liability, which corresponds to the discounted obligation of future lease payments arising from a lease, and a right-of-use (“ROU”) asset, which represents the lessee’s right to use, or control the use of, the underlying asset over the lease term. On January 1, 2019, we adopted the new standard using the modified retrospective approach and thus, we did not adjust the comparative periods presented. As a result of the adoption of this standard, we recorded a lease liability and related right-of-use asset of \$66 million and \$64 million, respectively. We elected the package of practical expedients under the transition guidance, which does not require the reassessment of whether existing contracts are or contain a lease, the reassessment of the lease classification for any expired or existing leases, or the reassessment of unamortized initial direct costs of existing leases. As an accounting policy election, we excluded short-term leases (leases that have a term of 12 months or less and do not include a purchase option that we are reasonably certain to exercise) from the balance sheet presentation. Additionally, we elected to account for non-lease components in a contract as part of a single lease component for all asset classes. We implemented a new lease accounting system and updated our business processes and internal controls to address relevant risks associated with the implementation of the new standard including the preparation of the required financial information and disclosures. See Note 18 for details.

In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815) - Targeted Improvements to Accounting for Hedging Activities*. The standard updated guidance on accounting for hedging activities. The new guidance simplifies hedge effectiveness documentation requirements, changes both the designation and measurement for qualifying hedging relationships and the presentation of hedge results. We adopted this accounting guidance in the first quarter of 2019. The adoption of the standard had an immaterial impact on our consolidated financial statements and disclosures.

In August 2018, the FASB also issued ASU 2018-14, *Compensation - Retirement Benefits - Defined Benefit Plans - General (Topic 715-20): Disclosure Framework - Changes to the Disclosure Requirements for Defined Benefit Plans*. The standard modifies the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans by removing and adding certain disclosures for these plans. The eliminated disclosures include (a) the amounts in Accumulated Other Comprehensive Income expected to be recognized in net periodic benefit costs over the next fiscal year, (b) the amount and timing of plan assets expected to be returned to the employer, and (c) the effects of a one-percentage-point change in assumed health care cost trend rates on the net periodic benefit costs and the benefit obligation for postretirement health care benefits. The new disclosures include the interest crediting rates for cash balance plans and an explanation of significant gains and losses related to changes in benefit obligations. This standard is effective for fiscal years and interim periods within those fiscal years beginning after December 15, 2020, with early adoption permitted. We early adopted this accounting standard for the year ended December 31, 2019 which did not have a material impact to our consolidated financial statements and disclosures.

Recently Issued Accounting Pronouncements

In December 2019, the FASB issued ASU 2019-12, *Income Taxes (“Topic 740”): Simplifying the Accounting for Income Taxes*. The standard simplifies the accounting for income taxes by removing the exceptions to the incremental approach for intraperiod tax allocation, the requirement to recognize deferred tax liability for equity method investments, the ability not to recognize a deferred tax liability for a foreign subsidiary when a foreign equity method investment becomes a subsidiary, and the general methodology for calculating income taxes in an interim period when a year-to-date loss exceeds the anticipated loss for the year. This standard is effective for fiscal years and interim periods within those fiscal years beginning after December 15, 2020 with early adoption permitted. We are currently evaluating the effect, if any, that the standard will have on our consolidated financial statements.

In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (“Topic 820”): Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement*. The standard modifies the disclosure requirements in Topic 820, Fair Value Measurement, by: removing certain disclosure requirements related to the fair value hierarchy; modifying existing disclosure requirements related to measurement uncertainty; and adding new disclosure requirements, such as disclosing the changes in unrealized gains and losses for the period included in other comprehensive income for recurring Level 3 fair value measurements held at the end of the reporting period and disclosing the range and weighted average of significant unobservable inputs used to develop Level 3 fair value measurements. This standard is effective for fiscal years and interim periods within those fiscal years beginning after December 15, 2019, with early adoption permitted. We do not expect the standard to have a material impact on our consolidated financial statements and disclosures.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments - Credit Losses (Topic 326)*, as amended. The standard introduces a new accounting model for expected credit losses on financial instruments, including trade receivables, based on estimates of current expected credit losses. This standard is effective for fiscal years beginning after December 15, 2019 and requires companies to apply the change in accounting on a prospective basis. The Company does not expect this guidance to have a material impact on the consolidated financial statements.

3. Cristal Acquisition and Related Divestitures

On April 10, 2019, we completed the acquisition of the TiO₂ business of Cristal for \$1.675 billion of cash, plus 37,580,000 ordinary shares. The total acquisition price, including the value of the ordinary shares at \$14 per share on the closing date of the Cristal Transaction, was approximately \$2.2 billion. With the acquisition of our shares, an affiliate of Cristal became our largest shareholder. At December 31, 2019, Cristal International Holdings B.V. (formerly known as Cristal Inorganic Chemical Netherlands Cooperatief W.A.), a wholly-owned subsidiary of National Titanium Dioxide Company Ltd., continues to own 37,580,000 shares of Tronox, or a 26% ownership interest. National Titanium Dioxide Company Ltd. is 79% owned by Tasnee.

In order to obtain regulatory approval for the Cristal Transaction, the FTC required us to divest Cristal's North American TiO₂ business, which we sold to INEOS on May 1, 2019, for cash proceeds, net of transaction costs, of \$701 million, inclusive of an amount for a working capital adjustment. The operating results of Cristal's North American TiO₂ business from the acquisition date to the date of divestiture are included in a single caption entitled "Net Income (Loss) from discontinued operations, net of tax" in our Consolidated Statements of Operations. See Note 6 for further information on discontinued operations.

In conjunction with the Cristal Transaction, we entered into a transition services agreement with Tasnee and certain of its affiliates under which we and the Tasnee entities will provide certain transition services to one another. See Note 24 for further details of the transition services agreement. In conjunction with the divestiture of Cristal's North American TiO₂ business to INEOS, we entered into a transition services agreement with INEOS. Under the terms of the transition services agreement, INEOS agreed to provide the following services to Tronox for manufacturing, technology and innovation, information technology, finance, warehousing and human resources. Similarly, Tronox will provide services to INEOS for information technology, finance, product stewardship, warehousing and human resources.

In addition, in order to obtain regulatory approval by the European Commission, we divested the 8120 paper laminate grade, supplied from our Botlek facility in the Netherlands, to Venator Materials PLC ("Venator"). The divestiture was completed on April 26, 2019. Under the terms of the divestiture, we will supply the 8120 grade product to Venator under a supply agreement for an initial term of 2 years, and extendable up to 3 years, to allow for the transfer of the manufacturing of the 8120 grade to Venator. Total cash consideration is 8 million Euros, of which 1 million Euros was paid at the closing and the remaining 7 million Euros (approximately \$6.2 million at December 31, 2019 exchange rate) will be paid in equal installments during the second quarters of 2020 and 2021. We recorded a charge of \$19 million during the second quarter of 2019, in "Contract loss" in the Consolidated Statements of Operations, reflecting both the proceeds on sale and the estimated losses we expect to incur under the supply agreement with Venator.

We funded the cash portion of the Cristal Transaction through existing cash, borrowings from our Wells Fargo Revolver, and restricted cash which had been borrowed under the Blocked Term Loan and which became available to us for the purpose of consummating the Cristal Transaction. See Note 15 for further details of the Cristal Transaction financing.

Preliminary Allocation of the Purchase Price

For the Cristal Transaction, we have applied the acquisition method of accounting in accordance with ASC 805, "Business Combinations", with respect to the identifiable assets and liabilities of Cristal, which have been measured at estimated fair value as of the date of the business combination.

The aggregate purchase price noted above was allocated to the identifiable assets acquired and liabilities assumed based upon their estimated fair values at the acquisition date, primarily using Level 2 and Level 3 inputs (see Note 2 for an explanation of Level 2 and Level 3 inputs). These fair value estimates represent management's best estimate of future cash flows (including sales, cost of sales, income taxes, etc.), discount

rates, competitive trends, market comparables and other factors. Inputs used were generally determined from historical data supplemented by current and anticipated market conditions and growth rates.

Although the determination of the preliminary fair values are substantially complete, certain fair value estimates are based on preliminary information and are subject to change during the measurement period, which ends one year from the date of the acquisition. During the measurement period, when new information is obtained about facts and circumstances that existed as of the acquisition date that, if known, would have resulted in revised estimated values of assets or liabilities assumed as of that date, we will revise the preliminary purchase price allocation and reflect the impact of any adjustments in the period in which the adjustments are determined. At December 31, 2019, the fair values that are based on preliminary information relate primarily to property, plant and equipment (including economic obsolescence), mineral leaseholds, contingent liabilities and certain noncurrent liabilities, and related impacts on deferred taxes and noncontrolling interest, if any. During the three months ended December 31, 2019, we updated the preliminary purchase price allocation from September 30, 2019, resulting in (i) increases to mineral leaseholds of \$26 million, pension and postretirement healthcare liabilities of \$14 million, and accounts payable and accrued liabilities of \$13 million; (ii) a decrease to deferred taxes of \$10 million; and (iii) other immaterial adjustments.

The purchase price consideration and preliminary estimated fair value of Cristal's net assets acquired on April 10, 2019 are shown below. The assets and liabilities of Cristal's North American TiO₂ business, that was subsequently divested on May 1, 2019, are shown as held for sale in the fair value of assets acquired and liabilities assumed (refer to Note 6).

	<u>Fair Value</u>
Purchase Price Consideration:	
Tronox Holdings plc shares issued	37,580,000
Tronox Holdings plc closing price per share on April 10, 2019	\$ 14.00
Total fair value of Tronox Holdings plc shares issued at acquisition date.	\$ 526
Cash consideration paid	\$ 1,675
Total Purchase Price	<u>\$ 2,201</u>
Fair Value of Assets Acquired	
Accounts receivable	\$ 248
Inventory	693
Deferred taxes	55
Prepaid and other assets	80
Property, plant and equipment	746
Mineral leaseholds	95
Intangible assets	62
Lease right of use assets	40
Other long-term assets	42
Assets held for sale	848
Total assets acquired	<u>\$ 2,909</u>
Less: Liabilities Assumed	
Accounts payable	\$ 102
Accrued liabilities	136
Short-term lease liabilities	13
Pension and postretirement healthcare benefits	76
Environmental liabilities	64
Asset retirement obligations	75
Long-term debt	22
Long-term lease liabilities	24
Other long-term liabilities	19
Liabilities held for sale	126
Total liabilities assumed	<u>\$ 657</u>
Less noncontrolling interest	<u>51</u>
Purchase price	<u>\$ 2,201</u>

Summary of Significant Fair Value Methods

The methods used to determine the fair value of significant identifiable assets and liabilities included in the preliminary allocation of purchase price are discussed below.

Inventory

Acquired inventory is comprised of finished goods, work in process and raw materials. The fair value of finished goods was calculated as the estimated selling price, adjusted for costs of the selling effort and a reasonable profit allowance relating to the selling effort. The fair value of work in process inventory was primarily calculated as the estimated selling price, adjusted for estimated costs to complete the manufacturing, estimated costs of the selling effort, as well as a reasonable profit margin on the remaining manufacturing and selling effort. The fair value of raw materials and supplies was determined based on historical carrying value which approximates fair value. The fair value step-up of inventories is being recognized in “Cost of sales” as the inventory is sold.

Assets held for sale and Liabilities of assets held for sale

As described above, in order to obtain regulatory approval for the acquisition, the U. S. FTC required us to divest Cristal’s North American TiO₂ business, which we sold to INEOS on May 1, 2019, for cash proceeds, net of transaction costs, of \$701 million. Refer to Note 6 for further information.

Property, Plant and Equipment

Property, plant and equipment (“PP&E”) is comprised of land and improvements of \$100 million; machinery and equipment of \$511 million; buildings of \$78 million; and construction in progress of \$57 million. The preliminary estimated fair value for PP&E was primarily determined using a replacement cost approach, although a market approach was used for land and certain types of equipment. The replacement cost approach measures the value of an asset by estimating the cost to acquire or construct comparable assets and adjusts for age and condition of the asset. The market approach represents a sales comparison that measures the value of an asset through an analysis of sales and offerings of comparable assets. Additionally, a discounted cash flow analysis (“Income Approach”) was used to quantify economic obsolescence (“EO”). An EO adjustment was made when the Income Approach indicated that there were insufficient cash flows to support the values established through the market and replacement cost approaches.

The final fair values for property, plant and equipment may differ from this preliminary determinations, largely resulting from the EO calculations.

Mineral Leaseholds

The acquired assets of Cristal include mining operations in Australia. The fair value of these assets was determined using the income approach, specifically a discounted cash flow analysis (“DCF”). The DCF includes significant estimates and assumptions with respect to the expected production of the mine over the estimated time period, sales prices, profit margins and the discount rate. The calculated DCF value using this Income Approach was then reduced by the fair values determined for PP&E (see PP&E methodology) in order to derive the fair value of mineral leaseholds. There was no EO required for mining and mineral separation assets.

Intangible Assets

Intangible assets primarily consist of acquired developed technology. The values of the developed technology were determined utilizing the relief from royalty method, which is a form of Income Approach.

Pension and Other Postretirement Liabilities

Tronox recognized a pretax net liability representing the unfunded portion of Cristal’s defined-benefit pension and other postretirement benefit (“OPEB”) plans.

Asset Retirement Obligations

Fair value is measured using expected future cash outflows discounted at our credit-adjusted risk-free interest rate. See Notes 2 and 19 to the consolidated financial statements for additional information.

Environmental Liabilities

Liabilities for environmental matters are recognized when remedial efforts are probable and the costs can be reasonably estimated. Such liabilities are based on our best estimate of the undiscounted future costs required to complete the remedial work. For further discussion, see Environmental Matters included elsewhere in this section entitled, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and Notes 2 and 20 to the consolidated financial statements.

Deferred Income Tax Assets and Liabilities

The deferred income tax assets and liabilities include tax loss carryforwards along with the expected future federal, state and foreign tax consequences associated with temporary differences between the preliminary fair values of the assets acquired and liabilities assumed and the respective tax bases. When applicable, valuation allowances were set up against deferred tax assets not expected to be realized. Tax rates utilized in calculating deferred income taxes represent the enacted statutory tax rates at the effective date of the merger in each respective jurisdiction. Refer to Note 8 for further information.

Noncontrolling Interests

Noncontrolling interest relates to Cristal’s historic noncontrolling interest in its publicly-traded Brazilian subsidiary. The fair value was calculated as a percentage of the fair value balance sheet of Cristal’s Brazilian subsidiary, which approximated the market capitalization of the subsidiary’s stock on the Brazilian stock exchange.

Other Assets Acquired and Liabilities Assumed

We utilized the carrying values, net of allowances, to value accounts receivable and accounts payable as well as other current assets and liabilities as it was determined that carrying values represented the fair value of those items at the acquisition date.

Results of Cristal Operations Since Acquisition

For the year ended December 31, 2019, the acquired Cristal business contributed \$1.0 billion in revenue and \$67 million in operating losses which includes the recognition of \$98 million of step-up in value of the acquired inventory.

Supplemental Pro Forma Financial Information

The following unaudited pro forma information gives effect to the Cristal Transaction as if it had occurred on January 1, 2018. The unaudited pro forma financial information reflects certain adjustments related to the acquisition, such as:

- a. conforming the accounting policies of Cristal to those applied by Tronox;
- b. conversion to U.S. GAAP from IFRS for Cristal;
- c. the elimination of transactions between Tronox and Cristal;
- d. recording certain incremental expenses resulting from purchase accounting adjustments, such as inventory step-up amortization, depreciation, depletion and amortization expense in connection with fair value adjustments to property, plant and equipment, mineral leaseholds and intangible assets;
- e. recording the contract loss on the sale of the 8120 product line as a charge in the first quarter of 2018;
- f. recording all transaction costs incurred in the first quarter of 2018;
- g. recording the effect on interest expense related to borrowings in connection with the Cristal Transaction; and
- h. recording the related tax effects and the impacts to EPS for the shares issued in conjunction with the transaction.

The unaudited pro forma financial information should not be relied upon as being indicative of the historical results that would have been obtained if the Cristal Transaction had actually occurred on that date, nor the results of operations in the future.

In accordance with ASC 805, the supplemental pro forma results of operations for the years ended December 31, 2019 and 2018, as if the Cristal Transaction had occurred on January 1, 2018, are as follows:

<u>Year Ended</u>	<u>Year Ended December 31</u>	
	<u>2019</u>	<u>2018</u>
Net Sales	\$3,008	\$3,339
Net income from continuing operations attributable to Tronox Holdings plc	\$ 18	\$ 32

For the year ended December 31, 2019, we incurred pre-tax charges of \$98 million related to the recognition of the step up to fair value of inventories acquired. We also incurred a pre-tax charge of \$19 million in contract losses incurred on the 8120 supply agreement with Venator for the year ended December 31, 2019. See Note 20. The 2019 pro forma results were adjusted to exclude these charges as these costs were reflected within the results of operations in the pro forma results as if they were incurred on January 1, 2018. For the year ended December 31, 2018, the pro forma results of operations reflect a pre-tax charges of \$98 million related to the recognition of the step up to fair value of inventories acquired as well as the total \$120 million of transaction costs.

4. Restructuring Initiatives

On April 10, 2019, we announced the completion of the Cristal Transaction. During the second quarter, as a result of the acquisition, we outlined a broad-based synergy savings program that is expected to reduce costs, simplify processes and focus the organization’s structure and resources on key growth initiatives. During the year ended December 31, 2019, we recorded costs of \$22 million in our Consolidated Statement of Operations relating to these initiatives. The costs consisted of charges for employee-related costs, including severance.

The liability balance for restructuring as of December 31, 2019, which is recorded within “Accrued liabilities” in the Consolidated Balance Sheet, is as follows:

	<u>Employee-Related Costs</u>
Balance, January 1, 2019	\$ —
Charges	22
Cash payments	(12)
Balance, December 31, 2019	<u>\$ 10</u>

5. Revenue

Nature of Contracts and Performance Obligations

We primarily generate revenue from selling TiO₂ pigment products, products derived from titanium bearing mineral sands and related co-products, primarily zircon and pig iron, to our customers. These products are used for the manufacture of paints, coatings, plastics, paper, and a wide range of other applications. We account for a contract with our customer when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance, and collectability of consideration is probable.

Our promise in a contract typically relates to the transferring of a product or multiple distinct products that are substantially the same and that have the same pattern of transfer, representing a single performance obligation within a contract. We have elected to account for shipping and handling activities that occur after control of the products has transferred to the customer as contract fulfillment activities, rather than a separate performance obligation. Amounts billed to a customer in a sales transaction related to shipping and handling activities continue to be reported as “Net sales” and related costs as “Cost of goods sold” in the Consolidated Statements of Operations.

The duration of our contract period is one year or less. As such, we have elected to recognize incremental costs incurred to obtain contracts, which primarily consist of commissions paid to third-party sales agents, as

“Selling, general and administrative expenses” in the Consolidated Statements of Operations. Furthermore, we have elected not to disclose the value of unsatisfied performance obligations at each period end, given the original expected duration of our contracts are one year or less.

Transaction Price

Revenue is measured as the amount of consideration that we expect to be entitled in exchange for transferring products to the customer. The transaction price typically consists of fixed cash consideration. We also offer various incentive programs to our customers, such as rebates, discounts, and other price adjustments that represent variable consideration. We estimate variable consideration and include such consideration amounts in the transaction price to the extent it is probable that a significant reversal of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is resolved. Our estimates of variable consideration and determination of whether to include estimated amounts in the transaction price are based largely on an assessment of our anticipated performance and all information (historical, current and forecasted) that is reasonably available to us. We adjust our estimate of revenue at the earlier of when the amount of consideration we expect to receive changes or when the consideration becomes fixed. Sales returns rarely happen in our business, therefore it is unlikely that a significant reversal of revenue will occur.

Sales and similar taxes we collect on behalf of governmental authorities are excluded from the transaction price for the determination of revenue. The expected costs associated with product warranties continue to be recognized as expense when the products are sold. Customer payment terms and conditions vary by contract and customer, although the timing of revenue recognition typically does not differ from the timing of invoicing. Additionally, as we generally do not grant extended payment terms, we have determined that our contracts generally do not include a significant financing component.

Revenue Recognition

We recognize revenue at a point in time when the customer obtains control of the promised products. For most transactions this occurs when products are shipped from our manufacturing facilities or at a later point when control of the products transfers to the customer at a specified destination or time.

Contract Balances

Contract assets represent our rights to consideration in exchange for products that have transferred to a customer when the right is conditional on situations other than the passage of time. For products that we have transferred to our customers, our rights to the consideration are typically unconditional and only the passage of time is required before payments become due. These unconditional rights are recorded as accounts receivable. As of December 31, 2019, and December 31, 2018, we did not have material contract asset balances.

Contract liabilities represent our obligations to transfer products to a customer for which we have received consideration from the customer. Infrequently we may receive advance payment from our customers that is accounted for as deferred revenue. Deferred revenue is earned when control of the product transfers to the customer, which is typically within a short period of time from when we received the advanced payment. Contract liability balances as of December 31, 2019 and December 31, 2018 were \$1 million and less than \$1 million, respectively. Contract liability balances were reported as “Accounts payable” in the Consolidated Balance Sheets. All contract liabilities as of December 31, 2018 were recognized as revenue in “Net sales” in the Consolidated Statements of Operations during the first quarter of 2019.

Disaggregation of Revenue

We operate under one operating and reportable segment, TiO₂. See Note 25 for details. We disaggregate our revenue from contracts with customers by product type and geographic area. We believe this level of disaggregation appropriately depicts how the nature, amount, timing and uncertainty of our revenue and cash flows are affected by economic factors and reflects how our business is managed.

Net sales to external customers by geographic areas where our customers are located were as follows:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
North America	\$ 696	\$ 649	\$ 572
South and Central America	164	72	61
Europe, Middle-East and Africa	954	541	518
Asia Pacific	<u>828</u>	<u>557</u>	<u>547</u>
Total net sales	<u>\$2,642</u>	<u>\$1,819</u>	<u>\$1,698</u>

Net sales from external customers for each similar type of product were as follows:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
TiO ₂	\$2,049	\$1,230	\$1,210
Zircon	290	293	209
Feedstock and other products	303	259	225
Electrolytic	<u>—</u>	<u>37</u>	<u>54</u>
Total net sales	<u>\$2,642</u>	<u>\$1,819</u>	<u>\$1,698</u>

Feedstock and other products mainly include rutile prime, ilmenite, chloride slag and other mining products. Electrolytic products mainly include electrolytic manganese dioxide and boron. We sold our Electrolytic operations on September 1, 2018. See Note 6. The nature, amount, timing and uncertainty of revenue and cash flows typically do not differ significantly among different products.

6. Discontinued Operations and Other Disposition

Discontinued Operations - 2019 and 2017

As discussed in Note 3, the Company divested Cristal’s North American TiO₂ business to INEOS on May 1, 2019, for cash proceeds, of \$701 million, net of transaction costs and a working capital adjustment. The operating results of Cristal’s North American TiO₂ business from the acquisition date to the date of divestiture are included in a single caption entitled “Net income from discontinued operations, net of tax” in our Consolidated Statements of Operations and is included in the table below.

In the third quarter of 2017, we completed the previously announced sale of our wholly owned subsidiary, Alkali, to Genesis Energy, L.P. Until it was sold, Alkali’s operations for the year ended December 31, 2017 were also accounted for as discontinued operations until sold.

The following table presents a summary of the operations of Cristal’s North American TiO₂ business for the year ended December 31, 2019 and the operations of Alkali for the year ended December 31, 2017. There were no discontinued operations in 2018:

	<u>Year ended December 31, 2019</u>	<u>Year ended December 31, 2017</u>
Net sales	\$41	\$ 521
Cost of goods sold	<u>29</u>	<u>448</u>
Gross profit.	12	73
Selling, general and administrative expense and other expenses.	<u>5</u>	<u>18</u>
Income before income taxes	7	55
Income tax provision	2	1
Loss on sale of discontinued operations, no tax impact.	<u>—</u>	<u>233</u>
Income from discontinued operations, net of tax	<u>\$ 5</u>	<u>\$(179)</u>

On September 1, 2018, Tronox LLC, our indirect wholly-owned subsidiary, sold to EMD Acquisition LLC certain of the assets and liabilities of our Henderson Electrolytic Operations based in Henderson, Nevada (the “Henderson Electrolytic Operations”), a component of our TiO₂ segment, for \$1.3 million in cash and a Secured Promissory Note of \$4.7 million. On December 27, 2018, we received the full settlement of the Promissory Note of \$4.7 million from EMD Acquisition LLC. For the year ended December 31, 2018, a total pre-tax loss on the sale of \$31 million was recorded in “Impairment loss” in the Consolidated Statements of Operations.

7. Other Income (Expense), Net

Other income (expense), net is comprised of the following:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
Net realized and unrealized foreign currency gains (losses)	\$ 5	\$29	\$(20)
Pension and postretirement benefit interest cost, expected return on assets and amortization of actuarial losses	(1)	(2)	(3)
Pension and postretirement benefit settlement gains ⁽¹⁾	1	3	—
Other, net	<u>(2)</u>	<u>3</u>	<u>1</u>
Total	<u>\$ 3</u>	<u>\$33</u>	<u>\$(22)</u>

(1) 2018 gain relates to our former U.S. retiree medical plan. See Note 23.

8. Income Taxes

Our operations are conducted through various subsidiaries in a number of countries throughout the world. We have provided for income taxes based upon the tax laws and rates in the countries in which operations are conducted and income is earned.

Income (loss) from continuing operations before income taxes is comprised of the following:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
United Kingdom	\$ 56	\$(122)	\$(74)
International	<u>(144)</u>	<u>165</u>	<u>(13)</u>
Income (loss) from continuing operations before income taxes	<u>\$ (88)</u>	<u>\$ 43</u>	<u>\$(87)</u>

The income tax (provision) benefit is summarized below:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
United Kingdom:			
Current	\$ —	\$ (1)	\$(2)
Deferred	11	3	1
International:			
Current	(23)	(33)	(2)
Deferred	<u>(2)</u>	<u>18</u>	<u>(3)</u>
Income tax (provision) benefit	<u>\$(14)</u>	<u>\$(13)</u>	<u>\$(6)</u>

The following table reconciles the applicable statutory income tax rates to our effective income tax rates for “Income tax (provision) benefit” as reflected in the Consolidated Statements of Operations.

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
Statutory tax rate	19%	19%	19%
Increases (decreases) resulting from:			
Tax rate differences	5	24	53
U.S. federal tax reform (including rate change)	—	(1)	(1,166)
Disallowable expenditures	(29)	88	(10)
Valuation allowances	(44)	(474)	675
Corporate Reorganization	—	—	375
Tax rate changes	17	41	3
State and local taxes	(7)	8	1
Prior year accruals	24	368	(1)
Branch taxation	(1)	(37)	43
Deferred gross margin	(4)	(9)	—
Other, net	<u>4</u>	<u>3</u>	<u>1</u>
Effective tax rate	<u>(16)%</u>	<u>30%</u>	<u>(7)%</u>

During the year ended December 31, 2017, Tronox Limited, our former public parent which is registered under the laws of the State of Western Australia, became managed and controlled in the U.K. The statutory tax rate in the U.K. at December 31, 2019, 2018 and 2017 was 19%.

The Company reached a settlement agreement with the Australian Tax Office (“ATO”) on November 26, 2018 for the tax years 2012 through 2015, which were under examination by the ATO. This settlement resulted in the accrual of an \$11 million current tax provision and the loss of \$154 million in deferred tax assets related to Australian net operating losses (“NOLs”). The change to deferred taxes is fully offset by a valuation allowance and results in no impact to the consolidated provision. The settlement of \$11 million was paid to the ATO in December 2018. Both the current tax provision and NOL adjustment from the ATO settlement are reflected in the “Prior year accruals” line of the effective tax rate table.

On December 22, 2017, the U.S. enacted major tax reform legislation. Our deferred tax impact of that legislation has been included in the effective income tax rate table above as a separate line item. It is almost entirely offset in the “Valuation allowances” line of the effective tax rate table. The gross deferred tax impacts were primarily from our large deferred tax assets being revalued from the previous U.S. statutory rate of 35% down to the enacted rate of 21%, executive compensation accruals which are no longer expected to be deductible under the new legislation, and a change to the portion of an indefinite lived deferred tax liability we could realize based on the new net operating loss indefinite carryforward period and usage limitation.

The effective tax rate for 2019, 2018 and 2017 differs from the United Kingdom statutory rate of 19% primarily due to prior year accruals, disallowable expenditures, U.S. tax reform legislation, valuation allowances, and rates different than the United Kingdom statutory rate of 19%. The 2018 rate was impacted by tax settlements for prior years and changes in tax rates in a foreign jurisdiction impacting our deferred tax assets, partially offset by a benefit of \$48 million due to the release of a valuation allowance for deferred tax assets associated with our operating subsidiary in the Netherlands.

Changes in our state apportionment factors and state statutory rate changes caused our overall effective state tax rates to change. Due to the large deferred tax asset created by the Anadarko litigation settlement in 2014, these state rate changes have a material impact on deferred taxes for 2017, 2018, and 2019. These are reflected within the Tax rate changes line above. The changes to deferred tax are offset by valuation allowances. During 2018, this line also includes the deferred tax impacts of tax rate reductions enacted in the Netherlands and the U.K. During 2019, a law change repealed a portion of the future Netherlands rate reduction, and this benefit is also reflected in the Tax rate changes line.

Upon completion of the Cristal Transaction, we now have additional jurisdictions with operational income. The statutory tax rates on income earned in Australia (30%), the United States (21%), South Africa (28%),

France (32%), China (25%), Brazil (34%), the Kingdom of Saudi Arabia (KSA) (20%), and the Netherlands (25%) are higher than the U.K. statutory rate of 19%. Tax rates will be reduced in France, the Netherlands, and the United Kingdom to 25.83%, 21.7% and 17%, respectively, in future years.

Net deferred tax assets (liabilities) at December 31, 2019 and 2018 were comprised of the following:

	<u>December 31,</u>	
	<u>2019</u>	<u>2018</u>
Deferred tax assets:		
Net operating loss and other carryforwards	\$ 1,899	\$ 1,672
Property, plant and equipment, net	115	77
Reserves for environmental remediation and restoration	45	21
Obligations for pension and other employee benefits	58	48
Investments	28	24
Grantor trusts	615	659
Inventories, net	10	4
Interest	243	238
Lease liabilities	27	—
Other accrued liabilities	10	1
Other	<u>11</u>	<u>10</u>
Total deferred tax assets	3,061	2,754
Valuation allowance associated with deferred tax assets	<u>(2,791)</u>	<u>(2,619)</u>
Net deferred tax assets	<u>270</u>	<u>135</u>
Deferred tax liabilities:		
Inventories, net	(6)	(2)
Property, plant and equipment, net	(242)	(208)
Intangible assets, net	(45)	(44)
Lease assets	(28)	—
Foreign exchange	(9)	—
Other	<u>(14)</u>	<u>(7)</u>
Total deferred tax liabilities	<u>(344)</u>	<u>(261)</u>
Net deferred tax liability	<u>\$ (74)</u>	<u>\$ (126)</u>
Balance sheet classifications:		
Deferred tax assets — long-term	\$ 110	\$ 37
Deferred tax liabilities — long-term	\$ (184)	\$ (163)
Net deferred tax liability	<u>\$ (74)</u>	<u>\$ (126)</u>

The application of business combination accounting on April 10, 2019 resulted in the remeasurement of deferred income taxes associated with the assets and liabilities of the acquired entities at fair value pursuant to ASC 805. As a result, net deferred tax assets of \$55 million were recorded in accordance with ASC 740. Significant changes by category impacted by the acquisition were related to Net operating loss and other carryforwards of \$186 million, Property, plant, and equipment \$49 million, and Reserves for environmental remediation and restoration \$23 million under deferred tax assets and to Property, plant and equipment, (\$49) million and Inventories (\$30) million under deferred tax liabilities in the above table. Acquired companies in certain jurisdictions also included valuation allowances in Australia, Brazil, Switzerland, and the United Kingdom of (\$123) million of the value in the above table.

The net deferred tax liabilities reflected in the above table include deferred tax assets related to grantor trusts, which were established as Tronox Incorporated emerged from bankruptcy during 2011. The balances relate to the assets contributed to such grantor trusts by Tronox Incorporated and the proceeds from the resolution of

previous litigation of \$5.2 billion during 2014, which resulted in additional deferred tax assets of \$2.0 billion. This increase was fully offset by valuation allowances. During 2018 and 2019, the U.S. net operating loss increased as the grantor trusts spent a portion of the funds received from the litigation.

There was an increase to our valuation allowance of \$172 million during 2019, a decrease of \$205 million in 2018, and a decrease of \$532 million in 2017. The table below sets forth the changes, by jurisdiction:

	<u>December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
Australia	\$ 89	\$(144)	\$ 359
United Kingdom	(2)	8	10
United States	54	(12)	(899)
The Netherlands	—	(57)	(1)
South Africa	—	—	(1)
Brazil	14	—	—
Switzerland	15	—	—
Belgium	<u>2</u>	<u>—</u>	<u>—</u>
Total (decrease) increase in valuation allowances	<u>\$172</u>	<u>\$(205)</u>	<u>\$(532)</u>

As part of the functions under business combination accounting pursuant to ASC 805 and deferred income taxes in accordance with ASC 740, the company evaluated deferred tax attributes in each jurisdiction for application of a valuation allowance. Some operations acquired in the Cristal Transaction included a full or partial valuation allowance at the time of acquisition. Evidence provided to the Company that was maintained previously to support valuation allowances at acquisition was used along with considerations of any changes in operations and possible combinations with deferred tax attributes of the Company’s existing operations in each jurisdiction. It was determined that France would remove its valuation allowance, Australia and Brazil would increase from partial to full valuation allowances, Belgium would add a full valuation allowance, and Switzerland and the United States would sustain full valuation allowances at acquisition.

We released the valuation allowance of the operating entity in the Netherlands in 2018. During the period ended June 30, 2018, the Company had accumulated enough objective positive evidence to support the prospective use of its deferred tax assets held by the operating entity in the Netherlands. The valuation allowance in Australia decreased following the Company’s settlement which reduced its prior year NOLs. This was partially offset by current year losses in Australia.

The decrease to our valuation allowance in the United States in 2017 was primarily the result of the tax reform legislation impacts. The increase to our valuation allowances in both Australia and the United Kingdom during 2017 was to offset deferred tax assets generated from book losses and Corporate Reorganization net capital losses. The decrease to the valuation allowance in The Netherlands is due to \$12 million NOL utilization, offset by the effect of foreign currency exchange rates changes between 2016 and 2017 of \$11 million.

At December 31, 2019, we maintain full valuation allowances related to the total net deferred tax assets in Australia, Brazil, Switzerland, and the United States, as we cannot objectively assert that these deferred tax assets are more likely than not to be realized. It is reasonably possible that a portion of these valuation allowances could be reversed within the next year due to increased book profitability levels. Future provisions for income taxes will include no tax benefits with respect to losses incurred and tax expense only to the extent of current U.S. state tax and current Brazil Social Contribution tax payments until the valuation allowances are eliminated. Additionally, we have valuation allowances against specific tax assets in the Netherlands, South Africa, and the United Kingdom.

These conclusions were reached by the application of ASC 740, *Income Taxes*, and require that all available positive and negative evidence be weighted to determine whether a valuation allowance should be recorded. The more significant evidential matter in Australia, the Netherlands, Switzerland, the United Kingdom, and the United States relates to recent book losses and the lack of sufficient projected taxable income. The most significant evidential matter for South Africa relates to capital losses and assets that cannot be depleted or depreciated for tax purposes.

An ownership change occurred during 2019 for the Cristal U.S. businesses as a result of the acquisition by the Company. These ownership changes resulted in a limitation under IRC Sections 382 and 383 related to the net operating losses of the Cristal U.S. businesses. The net limitations related to the ownership change resulted in a reduction of \$69 million of the acquired U.S. loss carryforward, offset by corresponding reduction to a valuation allowance. The Company did not have any transactions during 2019 that triggered an ownership change under IRC Sections 382 and 383 for the Tronox U.S. businesses.

The Company's ability to use U.S. net operating losses and section 163(j) interest expense carryforwards (which are subject to Section 382 limitations) generated by it could be substantially limited if the Company were to experience another ownership change as defined under IRC Section 382. In general, an ownership change would occur if the Company's "5-percent shareholders," as defined under IRC Section 382, including certain groups of persons treated as "5-percent shareholders," collectively increased their ownership in the Company by more than 50 percentage points over a rolling three-year period. If an ownership change does occur during 2020, the resulting impact could be a limitation of up to \$5.4 billion composed of both U.S. net operating losses and interest limitation carryforwards. There would be no impact on the future grantor trust deductions from an IRC Section 382 change. The balance of the future Grantor Trust deductions at December 31, 2019 was \$2.3 billion.

The deferred tax assets generated by tax loss carryforwards in Australia and the United States have been fully offset by valuation allowances. The expiration of these carryforwards at December 31, 2019 is shown below. The Australian, South African, French, Brazilian and United Kingdom tax loss carryforwards do not expire.

	2020	2021	2022	2023	2024	Thereafter	Unlimited	Total Tax Loss Carryforwards
United Kingdom	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ (149)	\$ (149)
Australia	—	—	—	—	—	—	(438)	(438)
The Netherlands	—	(7)	(32)	(36)	(29)	(34)	—	(138)
France	—	—	—	—	—	—	(231)	(231)
Brazil	—	—	—	—	—	—	(13)	(13)
Switzerland	—	—	(101)	(80)	—	—	—	(181)
U.S. Federal	—	—	—	—	—	(4,131)	(203)	(4,334)
U.S. State	(13)	(10)	(8)	(31)	(16)	(4,261)	(34)	(4,373)
Other	—	—	—	—	—	—	(3)	(3)
Total tax loss carryforwards	<u>\$(13)</u>	<u>\$(17)</u>	<u>\$(141)</u>	<u>\$(147)</u>	<u>\$(45)</u>	<u>\$(8,426)</u>	<u>\$(1,071)</u>	<u>\$(9,860)</u>

At December 31, 2019, Tronox Holdings plc had foreign subsidiaries with undistributed earnings. Although we would not be subject to income tax on these earnings, amounts totaling \$300 million could be subject to withholding tax if distributed. We have made no provision for deferred taxes for Tronox Holdings plc related to these undistributed earnings because they are considered to be indefinitely reinvested outside of the parents' taxing jurisdictions.

The noncurrent liabilities section of our Consolidated Balance Sheet does not reflect any reserves for uncertain tax positions for either 2019 or 2018.

Our Australian, South African, and Brazilian returns are closed through 2014. Our U.S. returns are closed through 2015. Our Netherlands, French and United Kingdom returns are closed through 2016.

We believe that we have made adequate provision for income taxes that may be payable with respect to years open for examination; however, the ultimate outcome is not presently known and, accordingly, additional provisions may be necessary and/or reclassifications of noncurrent tax liabilities to current may occur in the future.

On December 22, 2017, the U.S. government enacted the Tax Cuts and Jobs Act (H.R. 1), which created sweeping tax reform, and the SEC issued Staff Accounting Bulletin 118 (SAB 118), which provided guidance on accounting for tax effects of H.R. 1 under ASC 740. As listed above these acts significantly impacted the effective tax rate disclosure for the year ended December 31, 2018.

H.R. 1 included a number of broad and complex changes to the U.S. tax code. The most significant of these changes to the Company was the reduction of the federal corporate tax rate from 35% down to 21%. This change

represents the most substantial portion of the amount presented in the 2018 effective tax rate as U.S. federal tax reform. The effect of this rate change on the U.S. deferred tax assets and liabilities as well as their associated valuation allowance was considered to be complete during the year ended December 31, 2018. Other provisions of this tax reform had been reasonably estimated but were not yet deemed complete.

SAB 118 provides for a measurement period to complete the accounting for income taxes from H.R. 1 that should not extend beyond one year from the enactment date, or December 22, 2018. Under the guidance of SAB 118, our accounting for Tax Cuts and Jobs Act (H.R. 1) was considered complete as of December 22, 2018. There are no material financial statement differences for the year ended December 31, 2019, or any interim period therein, from the information reported for the year ended December 31, 2018 resulting from the additional guidance issued by both the Internal Revenue Service and state taxing authorities.

During the three months ended March 31, 2018, the Company took steps necessary to restore a deferred interest deduction previously determined to be non-deductible under preliminary guidance on the provisions of H.R. 1. Concerns surrounding the new Base Erosion and Anti-Abuse Tax (BEAT) along with the changes to interest expense deductibility under IRC §163(j) remained outstanding until the period ended December 31, 2019. An IRS Proposed Regulation issued December 2, 2019 regarding BEAT resolved those outstanding concerns. We believe the guidance which is currently available is sufficient to support our final position regarding the impact of U.S. tax reform.

9. Loss Per Share

The computation of basic and diluted loss per share for the periods indicated is as follows:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
Numerator – Basic and Diluted:			
Net income (loss) from continuing operations	\$ (102)	\$ 30	\$ (93)
Less: Net income (loss) from continuing operations attributable to noncontrolling interest	<u>12</u>	<u>37</u>	<u>13</u>
Undistributed net loss from continuing operations attributable to Tronox Holdings plc	(114)	(7)	(106)
Net (loss) income from discontinued operations available to ordinary shares	<u>5</u>	<u>—</u>	<u>(179)</u>
Net loss available to ordinary shares.	<u>\$ (109)</u>	<u>\$ (7)</u>	<u>\$ (285)</u>
Denominator – Basic and Diluted:			
Weighted-average ordinary shares (in thousands).	<u>139,859</u>	<u>122,881</u>	<u>119,502</u>
Net income (loss) per Ordinary Share:			
Basic and diluted net loss from continuing operations per ordinary share . . .	\$ (0.81)	\$ (0.06)	\$ (0.89)
Basic and diluted net (loss) income from discontinued operations per ordinary share.	<u>0.03</u>	<u>—</u>	<u>(1.50)</u>
Basic and diluted net loss per ordinary share.	<u>\$ (0.78)</u>	<u>\$ (0.06)</u>	<u>\$ (2.39)</u>

Net loss per ordinary share amounts were calculated from exact, unrounded net loss and share information. Prior to January 2019, we had issued shares of restricted stock which were participating securities that did not have a contractual obligation to share in losses; therefore, when we have a net loss, none of the loss is allocated to these participating securities. The restricted stock vested on January 29, 2019. Consequently, for the years ended December 31, 2019, 2018 and 2017, the two-class method did not have an effect on our net loss per ordinary share calculation, and as such, dividends paid during these periods did not impact this calculation.

In computing diluted net loss per share under the two-class method, we considered potentially dilutive shares. Anti-dilutive shares not recognized in the diluted net loss per share calculation for the years ended December 31, 2019, 2018 and 2017 were as follows:

	Shares		
	2019	2018	2017
Options	1,260,902	1,319,743	1,707,133
Series A Warrants	—	—	222,939
Series B Warrants	—	—	328,563
Restricted share units	5,557,659	5,336,433	5,478,269

Series A and Series B Warrants expired on February 14, 2018.

10. Inventories, net

Inventories, net consisted of the following:

	December 31,	
	2019	2018
Raw materials	\$ 205	\$102
Work-in-process.	129	43
Finished goods, net	573	225
Materials and supplies, net	224	109
Inventories, net - current.	<u>1,131</u>	<u>479</u>

Materials and supplies, net consists of processing chemicals, maintenance supplies, and spare parts, which will be consumed directly and indirectly in the production of our products.

At December 31, 2019 and 2018, inventory obsolescence reserves were \$39 million and \$13 million, respectively. At December 31, 2019 and December 31, 2018, reserves for lower of cost and net realizable value were \$25 million and \$17 million, respectively.

11. Property, Plant and Equipment

Property, plant and equipment, net of accumulated depreciation, consisted of the following:

	December 31,	
	2019	2018
Land and land improvements	\$ 191	\$ 96
Buildings	340	242
Machinery and equipment.	2,028	1,395
Construction-in-progress	156	63
Other	54	39
Total	2,769	1,835
Less: accumulated depreciation	(1,007)	(831)
Property, plant and equipment, net.	<u>\$ 1,762</u>	<u>\$1,004</u>

Substantially all the Property, plant and equipment, net is pledged as collateral for our debt. See Note 15. Refer to Note 3 for Property, plant and equipment acquired as a result of the Cristal Transaction.

The table below summarizes depreciation expense related to property, plant and equipment for the periods presented, recorded in the specific line items in our Consolidated Statements of Operations:

	Year Ended December 31,		
	2019	2018	2017
Cost of goods sold.	\$189	\$131	\$122
Selling, general and administrative expenses	5	3	3
Total	<u>\$194</u>	<u>\$134</u>	<u>\$125</u>

12. Mineral Leaseholds, net

Mineral leaseholds, net of accumulated depletion, consisted of the following:

	December 31,	
	2019	2018
Mineral leaseholds	\$1,352	\$1,238
Less accumulated depletion	(500)	(442)
Mineral leaseholds, net	<u>\$ 852</u>	<u>\$ 796</u>

Refer to Note 3 for Mineral leaseholds acquired as a result of the Cristal Transaction.

Depletion expense related to mineral leaseholds during 2019, 2018, and 2017 was \$56 million, \$35 million, and \$32 million, respectively, and was recorded in “Cost of goods sold” in the Consolidated Statements of Operations.

13. Intangible Assets, net

Intangible Assets, net of accumulated amortization, consisted of the following:

	December 31, 2019			December 31, 2018		
	Gross Cost	Accumulated Amortization	Net Carrying Amount	Gross Cost	Accumulated Amortization	Net Carrying Amount
Customer relationships	\$291	\$(173)	\$118	\$291	\$(154)	\$137
TiO ₂ technology ⁽¹⁾	92	(17)	75	32	(13)	19
Internal-use software and other	49	(34)	15	47	(27)	20
Intangible assets, net.	<u>\$432</u>	<u>\$(224)</u>	<u>\$208</u>	<u>\$370</u>	<u>\$(194)</u>	<u>\$176</u>

(1) Refer to Note 3 for Intangible assets acquired as a result of the Cristal Transaction.

The table below summarizes amortization expense related to intangible assets for the periods presented, recorded in the specific line items in our Consolidated Statements of Operations:

	Year Ended December 31,		
	2019	2018	2017
Cost of goods sold	\$ 2	\$ 1	\$ 1
Selling, general and administrative expenses	28	25	24
Total	<u>\$30</u>	<u>\$26</u>	<u>\$25</u>

Estimated future amortization expense related to intangible assets is \$32 million for 2020, \$31 million for 2021, \$28 million for 2022, \$27 million for 2023, \$26 million for 2024 and \$64 million thereafter.

14. Balance Sheet and Cash Flows Supplemental Information

Accrued liabilities consisted of the following:

	December 31,	
	2019	2018
Employee-related costs and benefits	\$103	\$ 69
Related party payables	7	—
Interest	16	16
Sales rebates	39	18
Restructuring	10	—
Taxes other than income taxes	6	5
Asset retirement obligations	16	6
Interest rate swaps	22	6
Professional fees and other	60	20
Liabilities held for sale	4	—
Accrued liabilities	<u>\$283</u>	<u>\$140</u>

Additional supplemental cash flow information for the year ended December 31, 2019 is as follows:

<u>Supplemental non cash information:</u>	<u>Year Ended December 31, 2019</u>
Investing activities- shares issued in the Cristal Transaction	\$526
Financing activities- debt assumed in the Cristal Transaction	\$ 22

15. Debt

SABB Credit Facility

On October 16, 2019, our KSA subsidiary entered into a short-term working capital facility with the Saudi British Bank (“SABB Facility”) for an amount up to SAR 70 million (approximately \$19 million) maturing in July 2020. The SABB Facility bears interest at the Saudi Inter Bank Offered Rate plus 180 basis points on outstanding balances. During October 2019, the Company borrowed SAR 50 million (or approximately \$13 million at December 31, 2019 exchange rate) under the SABB Facility and subsequently repaid the outstanding balance in December 2019.

Wells Fargo Revolver

On September 22, 2017, we entered into a new global senior secured asset-based syndicated revolving credit facility with Wells Fargo Bank, N.A. (the “Wells Fargo Revolver”). The Wells Fargo Revolver which initially provided us with up to \$550 million of revolving credit lines, with an \$85 million sublimit for letters of credit, and has a maturity date of September 22, 2022. Our availability of revolving credit loans and letters of credit is subject to a borrowing base. Borrowings bear interest at our option, at either an adjusted London Interbank Offered Rate (“LIBOR”) plus an applicable margin that ranges from 1.25% to 1.75%, or a base rate, which is defined to mean the greatest of (a) the administrative agent’s prime rate, (b) the Federal funds effective rate plus 0.50% and (c) the adjusted LIBOR for a one month period plus 1.00% plus a margin that ranges from 0.25% to 0.75%, in each case, based on the average daily borrowing availability.

On March 22, 2019, we entered into a consent and amendment to the Wells Fargo Revolver and an amendment to our Term Loan Facility. The purpose of each amendment was to, among other things, (i) permit the refinancing of certain existing indebtedness incurred by our South African subsidiaries, Tronox KZN Sands Proprietary Limited and Tronox Mineral Sands Proprietary Limited, and the proposed uses of proceeds thereof, and (ii) implement required provisions in both the Wells Fargo Revolver and Term Loan Facility necessary in connection with the establishment of Tronox Holdings plc.

The Wells Fargo Revolver amendment also modified certain components of the borrowing base in order to increase the potential availability of credit. We also voluntarily reduced the revolving credit lines under the Wells Fargo Revolver from \$550 million to \$350 million. As a result of this modification, we accelerated the recognition of a portion of the deferred financing costs related to the Wells Fargo Revolver and during the three months ended March 31, 2019, recorded a charge of \$2 million in “Loss on extinguishment of debt” within the Consolidated Statement of Operations. At December 31, 2019, there were no outstanding revolving credit loans under the Wells Fargo Revolver, excluding \$21 million of issued and undrawn letters of credit under the Wells Fargo Revolver. Debt issuance costs associated with the Wells Fargo Revolver of \$3 million were included in “Other long-term assets” in the Consolidated Balance Sheets at December 31, 2019 and are being amortized over the life of the Wells Fargo Revolver.

The Wells Fargo Revolver contains a springing financial covenant that requires the Company and its restricted subsidiaries to maintain a consolidated fixed charge coverage ratio of at least 1.0:1.0 during certain test periods based on borrowing availability under the Wells Fargo Revolver or following the occurrence of specified events of default.

ABSA Revolving Credit Facility

On December 13, 2017, we entered into an agreement for a revolving credit facility with ABSA Bank Limited (“ABSA”) acting through its ABSA Capital Division for an amount up to R750 million (or approximately \$54 million at December 31, 2019 exchange rate) maturing on December 13, 2020 (the “ABSA Revolver”). In connection with the Standard Bank Revolver entered into on March 25, 2019, discussed below,

the ABSA Revolver was terminated on March 26, 2019. As a result of the termination, we accelerated the recognition of the remaining deferred financing costs related to the ABSA Revolver during the three months ended March 31, 2019 and recorded less than \$1 million in “Loss on extinguishment of debt” within the Consolidated Statement of Operations.

Standard Bank Credit Facility

On March 25, 2019, our South African subsidiaries, Tronox KZN Sands Proprietary Limited and Tronox Mineral Sands Proprietary Limited, entered into the Standard Bank Credit Facility for an amount up to R1 billion (approximately \$72 million at December 31, 2019 exchange rate) maturing on March 25, 2022. The Standard Bank Credit Facility bears interest at the Johannesburg Interbank Average Rate (“JIBAR”) plus 260 basis points when net leverage for our South African subsidiaries (total combined debt outstanding under the Standard Bank Revolver and Standard Bank Term less cash and cash equivalents divided by the consolidated EBITDA) is less than 1.5 and JIBAR plus 285 basis points when net leverage is greater than 1.5. There were no balances outstanding at December 31, 2019.

Standard Bank Term Loan Facility

On March 25, 2019, our South African subsidiaries, Tronox KZN Sands Proprietary Limited and Tronox Mineral Sands Proprietary Limited, entered into the Standard Bank Term Loan Facility with a maturity date of March 25, 2024. The Term Loan Facility consists of (i) an aggregate principal amount of R2.6 billion (“Amortizing Loan”, approximately \$186 million at December 31, 2019 exchange rate) the principal of which will be paid back at 5 percent per quarter over the five year term of the loan, and (ii) an aggregate principal amount of R600 million (“Bullet Loan”) the principal of which was to be paid back at the maturity date of the Standard Bank Term Loan Facility. During the third quarter of 2019, we repaid the outstanding balance on the Bullet Loan.

The Amortizing Loan bears interest at JIBAR plus 260 basis points when net leverage of the South African subsidiaries is less than 1.5 and JIBAR plus 285 points when net leverage is greater than 1.5. At December 31, 2019, the outstanding principal amounts for the Amortizing Loan was R2.2 billion (approximately \$158 million).

The Standard Bank Term Loan Facility contains financial covenants relating to certain ratio tests.

Cristal Debt Acquired

As part of the Cristal Transaction, we became party to certain debt arrangements as described below:

- A revolving credit facility with Emirates NBD PJSC, that originally matured on December 31, 2019 and was extended to to March 31, 2020, under which we will have the ability to borrow up to approximately \$50 million. The revolver is secured by inventory and trade receivables of Cristal Pigment UK Ltd. Under the terms of the revolver, for U.S. dollar borrowings the interest rate is LIBOR plus 2.25% while the interest rate for Euro borrowings is Euribor plus 2.25%. There were no borrowings outstanding under this revolver at December 31, 2019.
- A working capital debt agreement in China (“Tikon Loan”) that matures in April and May of 2021. The Tikon Loan bears interest based on an official lending basis rate per annum as announced and published by the People’s Bank of China plus a 7% premium. At December 31, 2019, the outstanding balance on the Tikon Loan was approximately CNY 111 million (approximately \$16 million USD at December 31, 2019 exchange rate).
- An interest free loan with the Australian government (“Australian Government Loan”) that matures in December 2021 subject to renewal every 5 years with final termination in December 2036. The loan balance due upon maturity is AUD 6 million (approximately \$5.3 million at December 31, 2019 exchange rate). At December 31, 2019, the discounted value on the Australian Government Loan was approximately AUD 1.5 million (approximately \$1 million at December 31, 2019 exchange rate).

Long-term Debt

Long-term debt, net of an unamortized discount and debt issuance costs, consisted of the following:

	<u>Original Principal</u>	<u>Annual Interest Rate</u>	<u>Maturity Date</u>	<u>December 31, 2019</u>	<u>December 31, 2018</u>
Term Loan Facility, net of unamortized discount ⁽¹⁾	\$2,150	Variable	9/22/2024	\$1,805	\$2,119
Senior Notes due 2025	450	5.75%	10/1/2025	450	450
Senior Notes due 2026	615	6.50%	4/15/2026	615	615
Standard Bank Term Loan Facility ⁽¹⁾	222	Variable	3/25/2024	158	—
Tikon Loan	N/A	Variable	5/23/2021	16	—
Australian Government Loan, net of unamortized discount	N/A	N/A	12/31/2036	1	—
Finance leases				<u>15</u>	<u>16</u>
Total debt				3,060	3,200
Less: Long-term debt due within one year				(38)	(22)
Debt issuance costs				<u>(34)</u>	<u>(39)</u>
Long-term debt, net				<u>\$2,988</u>	<u>\$3,139</u>

(1) The average effective interest rate for the Term Loan Facility was 5.6% and 5.5% for the years ended December 31, 2019 and 2018, respectively. The average effective interest rate on the Standard Bank Term Loan Facility was 9.7% for the year ended December 31, 2019.

At December 31, 2019, the scheduled maturities of our long-term debt were as follows:

	<u>Total Borrowings</u>
2020	38
2021	54
2022	38
2023	38
2024	1,824
Thereafter	<u>1,080</u>
Total	3,072
Remaining accretion associated with the Term Loan Facility and Australian Government Loan	<u>(12)</u>
Total borrowings	<u>3,060</u>

Term Loan Facility

On September 22, 2017, we entered into a new senior secured first lien term loan facility (the “Term Loan Facility”) with the lenders party thereto and Bank of America, N.A., as administrative agent, with a maturity date of September 22, 2024. The Term Loan Facility consists of (i) a U.S. dollar term facility in an aggregate principal amount of \$1.5 billion (the “Term Loans”) with our subsidiary, Tronox Finance LLC (“Tronox Finance”) as the borrower and (ii) a U.S. dollar term facility in an aggregate principal amount of \$650 million (the “Blocked Term Loan”) with our unrestricted subsidiary, Tronox Blocked Borrower LLC (the “Blocked Borrower”) as the borrower, which Blocked Term Loan was funded into a blocked account. Upon consummation of the Cristal Transaction on April 10, 2019, the Blocked Borrower merged with and into Tronox Finance, and the Blocked Term Loan became available to Tronox Finance.

Pursuant to the terms of the Term Loan Facility in the event of an asset sale, some or all of the net proceeds from the sale may be required to be used to prepay borrowings under the Term Loan Facility based on the ratio of the total combined debt outstanding under the Term Loan Facility and the Wells Fargo Revolver to the consolidated EBITDA for the previous four quarters, as defined in the Term Loan Facility (the “First Lien Net Leverage Ratio”). If this ratio is greater than three, then all of the net proceeds from an asset sale would be required to be used to prepay borrowings under the Term Loan Facility, while if the ratio were less than three but

greater than 2.75, 50% of the net proceeds would be required for prepayment and if the ratio were less than 2.75, no prepayment would be required. On May 1, 2019, we divested Cristal's North American operations for approximately \$701 million and subsequent to the sale, our First Lien Net Leverage Ratio was below 2.75, and, as a result, the sale of the North American operations did not trigger a prepayment event.

The Term Loan Facility bears interest at the "Applicable Rate" defined by reference to a grid-pricing matrix that relates to our First Lien Net Leverage Ratio. Based upon our First Lien Net Leverage Ratio the Applicable Rate under the Term Loan Facility as of December 31, 2019 was 2.75% basis points plus LIBOR. The Term Loan Facility was issued net of an original issue discount of \$11 million.

On February 25, 2019, we entered into an amendment to both our Term Loan Facility and Wells Fargo Revolver. The purpose of each amendment was to make certain of our U.K. subsidiaries restricted subsidiaries, update the relevant indebtedness disclosure schedules to include certain inter-company indebtedness that had been in existence prior to the execution of each such facility, and waive an administrative omission under such facility. As a result of this amendment, the Company made two mandatory principal prepayments on the Term Loan Facility as follows: 1) \$95 million subsequent to the issuance of the Standard Bank Term Loan Facility in March 2019 and 2) \$100 million subsequent to the divestiture of the Cristal North American TiO₂ business. The Company accounted for both of these mandatory principal prepayments as debt modifications in accordance with ASC 470. Additionally, in December 2019, the Company made a voluntary prepayment of \$100 million on the Term Loan Facility. As a result of the voluntary prepayment, we accelerated the recognition of a portion of deferred financing costs and discount related to the Term Loan Facility and recorded \$1 million in "Loss on extinguishment of debt" within the Consolidated Statement of Operations. No prepayment penalties were required as a result of these principal prepayments.

Senior Notes due 2025

On September 22, 2017, Tronox Finance plc, issued 5.75% senior notes due 2025 for an aggregate principal amount of \$450 million (the "Senior Notes due 2025"), which notes were issued under an indenture dated September 22, 2017 (the "2025 Indenture"). The 2025 Indenture and the Senior Notes due 2025 provide among other things, that the Senior Notes due 2025 are senior unsecured obligations of Tronox Finance plc and are guaranteed on a senior and unsecured basis by us and certain of our other subsidiaries. The Senior Notes due 2025 have not been registered under the Securities Act, and may not be offered or sold in the U.S. absent registration or an applicable exemption from registration requirements. Interest is payable on April 1 and October 1 of each year beginning on April 1, 2018 until their maturity date of October 1, 2025. The terms of the 2025 Indenture, among other things, limit, in certain circumstances, the ability of us and certain of our subsidiaries to: incur secured indebtedness, engage in certain sale-leaseback transactions and merge, consolidate or sell substantially all of our assets. The terms of the 2025 Indenture also include certain limitations on our non-guarantor subsidiaries incurring indebtedness.

Senior Notes due 2026

On April 6, 2018, Tronox Incorporated issued 6.5% Senior Notes due 2026 for an aggregate principal amount of \$615 million ("Senior Notes due 2026"). The 2026 Indenture and the Senior Notes due 2026 provide, among other things, that the Senior Notes due 2026 are senior unsecured obligations of Tronox Incorporated and are guaranteed on a senior and unsecured basis by us and certain of our other subsidiaries. The Senior Notes due 2026 have not been registered under the Securities Act and may not be offered or sold in the U.S. absent registration or an applicable exemption from registration requirements. Interest is payable on April 15 and October 15 of each year beginning on October 15, 2018 until their maturity date of April 15, 2026. The terms of the 2026 Indenture, among other things, limit, in certain circumstances, our and certain of our subsidiaries ability to: incur secured indebtedness; engage in certain sale-leaseback transactions; and merge, consolidate or sell substantially all of our assets. The terms of the 2026 Indenture also include certain limitations on our non-guarantor subsidiaries incurring indebtedness. The proceeds of the offering were used to fund the redemption of our Senior Notes due 2022. Debt issuance costs of \$10 million related to the Senior Notes due 2026 were recorded as a direct reduction of the carrying value of the long-term debt. Additionally, in connection with the redemption of our Senior Notes due 2022, we recorded \$30 million in debt extinguishment costs including a call premium of \$22 million during the second quarter of 2018.

Debt Covenants

At December 31, 2019, we are in compliance with all financial covenants in our debt facilities.

Interest and Debt Expense, Net

Interest and debt expense, net in the Consolidated Statements of Operations consisted of the following:

	Year Ended December 31,		
	2019	2018	2017
Interest on debt	\$186	\$180	\$171
Amortization of deferred debt issuance costs and discounts on debt	8	11	15
Capitalized interest.	(1)	(3)	(2)
Interest on capital leases and letters of credit and commitments	8	5	4
Total interest and debt expense, net	<u>\$201</u>	<u>\$193</u>	<u>\$188</u>

In connection with obtaining debt, we incurred debt issuance costs, which are being amortized through the respective maturity dates using the effective interest method for our long-term debt and on a straight-line basis for our Wells Fargo Revolver. At December 31, 2019, we had deferred debt issuance costs of \$3 million related to the Wells Fargo Revolver, which is recorded in “Other long-term assets” in the Consolidated Balance Sheets. At December 31, 2019, we had \$12 million and \$34 million of debt discount and debt issuance costs, respectively, related to our term loan and senior notes, which were recorded as a direct reduction of the carrying value of the long-term debt in the Consolidated Balance Sheets.

16. Derivative Financial Instruments

Interest Rate Risk

During the second quarter of 2019, we entered into interest-rate swap agreements with an aggregate notional value of \$750 million representing a portion of our Term Loan Facility, which effectively converts the variable rate to a fixed rate for that portion of the loan. The agreements expire in September 2024. The Company’s objectives in using the interest-rate swap agreements are to add stability to interest expense and to manage its exposure to interest rate movements. These interest rate swaps have been designated as cash flow hedges and involve the receipt of variable amounts from a counterparty in exchange for the Company making fixed-rate payments over the life of the agreements without exchange of the underlying notional amount.

Fair value gains or losses on these cash flow hedges are recorded in other comprehensive (loss) income and are subsequently reclassified into interest expense in the same periods during which the hedged transactions affect earnings. For the year ended December 31, 2019, the amounts recorded in interest expense related to the interest-rate swap agreements was less than \$1 million. The fair value of the outstanding interest-rate swap contracts at December 31, 2019 was \$22 million and was included in “Accrued liabilities” with a corresponding amount recorded in “Accumulated other comprehensive loss” on the Consolidated Balance Sheet.

Foreign Currency Risk

During the third quarter of 2019, we entered into foreign currency contracts used to hedge forecasted third party non-functional currency sales for our South African subsidiaries and forecasted non-functional currency cost of goods sold for our Australian subsidiaries. These foreign currency contracts are designated as cash flow hedges. Changes to the fair value of these foreign currency contracts are recorded as a component of other comprehensive (loss) income, if these contracts remain highly effective, and are recognized in net sales or costs of goods sold in the period in which the forecasted transaction affects earnings or are recognized in other income (expense) when the transactions are no longer probable of occurring.

As of December 31, 2019, we had notional amounts of (i) 3.7 billion South African rand (approximately \$265 million at December 31, 2019 exchange rate) that expire between January 30, 2020 and February 25, 2021 to reduce the exposure of our South African subsidiaries’ third party sales to fluctuations in currency rates, and (ii) 486 million Australian dollars (approximately \$341 million at December 31, 2019 exchange rate) that expire between January 30, 2020 and February 25, 2021 to reduce the exposure of our Australian subsidiaries’ cost of sales to fluctuations in currency rates. For the year ended December 31, 2019, we recorded a gain of \$5 million and \$3 million in “Net sales” and “Cost of goods sold” respectively on the Consolidated Statement of Operations, related to our cash flow hedges. There were no amounts recognized for foreign currency cash flow hedges in the comparative periods of 2018. At December 31, 2019, the unrealized net gain associated with the

open contracts used to hedge forecasted third party non-functional currency sales for our South African subsidiaries and the net unrealized gain associated with the open contracts to hedge forecasted non-functional currency cost of goods sold for our Australian subsidiaries was approximately \$25 million and \$12 million, respectively, of which \$34 million is included in “Prepaid and other assets” and \$3 million is included in “Other long-term assets” on our Consolidated Balance Sheet. Additionally, a corresponding \$30 million credit, net of tax, is recorded in “Accumulated other comprehensive loss” on the Consolidated Balance Sheet which is expected to be recognized in earnings over the next twelve months.

We enter into foreign currency contracts for the South African rand to reduce exposure of our subsidiaries’ balance sheet accounts not denominated in our South African subsidiaries’ functional currency to fluctuations in foreign currency exchange rates. For accounting purposes, these foreign currency contracts are not considered hedges. The change in fair value associated with these contracts is recorded in “Other income (expense), net” within the Consolidated Statement of Operations and partially offsets the change in value of third party and intercompany-related receivables not denominated in the functional currency of the subsidiary. At December 31, 2019, there was \$4 million, in the aggregate, of notional amount of outstanding foreign currency contracts with a fair value of a gain of less than \$1 million. We determined the fair value of the foreign currency contracts using inputs other than quoted prices in active markets that are observable either directly or indirectly. The fair value hierarchy for the foreign currency contracts is a Level 2 input. For the year ended December 31, 2019, the gain associated with these contracts was \$7 million recorded in “Other income (expense), net” within the Consolidated Statement of Operations.

17. Fair Value Measurement

For financial instruments that are subsequently measured at fair value, the fair value measurement is grouped into levels. See Note 2.

Our debt is recorded at historical amounts. The following table presents the fair value of our debt and derivative contracts at both December 31, 2019 and December 31, 2018:

	December 31, 2019	December 31, 2018
Term Loan Facility	\$1,820	\$2,074
Standard Bank Term Loan Facility	158	—
Senior Notes due 2025	459	368
Senior Notes due 2026	636	518
Tikon Loan	16	—
Australian Government Loan	1	—
Interest rate swaps	22	—
Foreign currency contracts	37	—

We determined the fair value of the Term Loan Facility, the Senior Notes due 2025 and the Senior Notes due 2026 using quoted market prices, which under the fair value hierarchy is a Level 1 input.

We determined the fair value of the foreign currency contracts and interest rate swaps using inputs other than quoted prices in active markets that are observable either directly or indirectly. The fair value hierarchy for the foreign currency contracts and interest rate swaps is a Level 2 input.

The carrying value of cash and cash equivalents, restricted cash, accounts receivable and accounts payable approximate fair value due to the short-term nature of these items.

18. Leases

Financial information for the year ended December 31, 2019 is presented under the new standard, while the comparative periods are not required since we adopted the new standard using the modified retrospective adjustment approach. See Note 2 for further details.

Lease expense for the year ended December 31, 2019 was comprised of the following:

	<u>Year Ended December 31, 2019</u>
Operating lease expense	\$41
Finance lease expense:	
Amortization of right-of-use assets	1
Interest on lease liabilities	2
Short term lease expense	22
Variable lease expense	<u>20</u>
Total lease expense	<u>\$86</u>

The table below summarizes lease expense for the year ended December 31, 2019, recorded in the specific line items in our Consolidated Statements of Operations:

	<u>Year Ended December 31, 2019</u>
Cost of goods sold	\$80
Selling, general and administrative expenses	<u>6</u>
Total	<u>\$86</u>

The weighted-average remaining lease term in years and weighted-average discount rates at December 31, 2019 were as follows:

	<u>December 31, 2019</u>
Weighted-average remaining lease term:	
Operating leases	3.7
Finance leases	10.4
Weighted-average discount rate:	
Operating leases	8.5%
Finance leases	14.2%

The maturity analysis for operating leases and finance leases at December 31, 2019 were as follows:

	<u>Operating Leases</u>	<u>Finance Leases</u>
2020	\$ 44	\$ 3
2021	35	3
2022	17	3
2023	7	3
2024	5	3
Thereafter	<u>8</u>	<u>15</u>
Total lease payments	116	30
Less: imputed interest	<u>(16)</u>	<u>(15)</u>
Present value of lease payments	<u>\$100</u>	<u>\$ 15</u>

The minimum commitments for operating leases and finance leases at December 31, 2018 were as follows:

	<u>Operating Leases</u>	<u>Finance Leases</u>
2019	\$15	\$ 3
2020	6	3
2021	5	3
2022	4	3
2023	3	3
Thereafter	<u>4</u>	<u>18</u>
Total lease payments	<u>\$37</u>	<u>\$33</u>

Total rent expense related to operating leases recorded in “Cost of goods sold” in the Consolidated Statement of Operations was \$22 million each during 2018 and 2017. Total rent expense related to operating leases recorded in “Selling, general and administrative expense” in the Consolidated Statement of Operations was \$2 million each during 2018 and 2017. During both 2018 and 2017, we made principal payments of less than \$1 million for finance leases.

Additional information relating to cash flows and ROU assets for the year ended December 31, 2019 is as follows:

	<u>December 31, 2019</u>
Cash paid for amounts included in the measurement of lease liabilities:	
Operating cash flows used for operating leases	\$41
Operating cash flows used for finance leases	\$ 2
Financing cash flows used for finance leases	\$ 1

Additional information relating to ROU assets for the year ended December 31, 2019 is as follows:

	<u>Year Ended December 31, 2019</u>
ROU assets obtained in exchange for lease obligations:	
Operating leases obtained in the normal course of business	\$28
Operating leases acquired in connection with Cristal acquisition	\$40

As of December 31, 2019, we have additional operating leases, primarily for equipment and machinery, that have not yet commenced. The related ROU asset is approximately \$1 million. These leases will commence later in 2020 with lease terms of approximately two years.

19. Asset Retirement Obligations

Asset retirement obligations consist primarily of rehabilitation and restoration costs, landfill capping costs, decommissioning costs, and closure and post-closure costs. Activity related to asset retirement obligations was as follows:

	<u>Year Ended December 31,</u>	
	<u>2019</u>	<u>2018</u>
Balance, January 1	\$ 74	\$82
Additions	3	6
Accretion expense	10	5
Remeasurement/translation	—	(8)
Changes in estimates, including cost and timing of cash flows	(8)	(4)
Settlements/payments	(4)	(3)
Acquired with the acquisition of Cristal	83	—
Disposed with the sale of Henderson Electrolytic	<u>—</u>	<u>(4)</u>
Balance, December 31	<u>\$158</u>	<u>\$74</u>

	<u>December 31,</u>	
	<u>2019</u>	<u>2018</u>
Asset retirement obligations were classified as follows:		
Current portion included in “Accrued liabilities”.....	\$ 16	\$ 6
Noncurrent portion included in “Asset retirement obligations”.....	<u>142</u>	<u>68</u>
Asset retirement obligations.....	<u>\$158</u>	<u>\$74</u>

We used the following assumptions in determining asset retirement obligations at December 31, 2019: inflation rates between 1.6% - 4.9% per year; credit adjusted risk-free interest rates between 6.0% -16.8%; the life of mines between 1-28 years and the useful life of assets between 3-34 years.

Environmental Rehabilitation Trust

In accordance with applicable regulations, we have established an environmental rehabilitation trust for the prospecting and mining operations in South Africa, which receives, holds, and invests funds for the rehabilitation or management of asset retirement obligations. The trustees of the fund are appointed by us, and consist of sufficiently qualified employees capable of fulfilling their fiduciary duties. At December 31, 2019 and 2018, the environmental rehabilitation trust assets were \$14 million and \$12 million, respectively, which were recorded in “Other long-term assets” in the Consolidated Balance Sheets.

20. Commitments and Contingencies

Purchase and Capital Commitments—At December 31, 2019, purchase commitments were \$214 million for 2020, \$64 million for 2021, \$47 million for 2022, \$43 million for 2023, \$38 million for 2024, and \$80 million thereafter.

Letters of Credit—At December 31, 2019, we had outstanding letters of credit and bank guarantees of \$73 million, of which \$24 million were letters of credit and \$49 million were bank guarantees. Amounts for performance bonds were not material.

Environmental Matters—It is our policy to record appropriate liabilities for environmental matters when remedial efforts are probable and the costs can be reasonably estimated. Such liabilities are based on our best estimate of the undiscounted future costs required to complete the remedial work. The recorded liabilities are adjusted periodically as remediation efforts progress or as additional technical, regulatory or legal information becomes available. Given the uncertainties regarding the status of laws, regulations, enforcement policies, the impact of other potentially responsible parties, technology and information related to individual sites, we do not believe it is possible to develop an estimate of the range or reasonably possible environmental loss in excess of our recorded liabilities. We expect to fund expenditures for these matters from operating cash flows. The timing of cash expenditures depends principally on the timing of remedial investigations and feasibility studies, regulatory approval of cleanup projects, remedial techniques to be utilized and agreements with other parties. Included in these environmental matters are the following:

Hawkins Point Plant. Residual waste mud, known as Batch Attack Mud, and a spent sulfuric waste stream were deposited in an onsite repository (the “Batch Attack Lagoon”) at a former TiO₂ manufacturing site, Hawkins Point Plant in Baltimore, Maryland, operated by Cristal USA, Inc. from 1954 until 2011. We assumed responsibility for remediation of the Hawkins Point Plant when we acquired the TiO₂ business of Cristal in April 2019. In 1984, a predecessor of Cristal and the Maryland Department of the Environment (“MDE”) entered into a consent decree (the “Consent Decree”) to address the Batch Attack Lagoon. The Consent Decree required that Cristal close the Batch Attack Lagoon when the Hawkins Point Plant ceased operations. In addition, we are investigating whether hazardous substances are migrating from the Batch Attack Lagoon. A provision of \$56 million has been made in our financial statements for the Hawkins Point Plant consistent with the accounting policy described above. We are in discussions with the MDE regarding a new consent decree to address both the Batch Attack Lagoon as well as other environmental contamination issues associated with the Hawkins Point Plant.

Other Matters—We are subject to a number of other lawsuits, investigations and disputes (some of which involve substantial amounts claimed) arising out of the conduct of our business, including matters relating to commercial transactions, prior acquisitions and divestitures, including our acquisition of Cristal, employee benefit

plans, intellectual property, and environmental, health and safety matters. We recognize a liability for any contingency that is probable of occurrence and reasonably estimable. We continually assess the likelihood of adverse judgments of outcomes in these matters, as well as potential ranges of possible losses (taking into consideration any insurance recoveries), based on a careful analysis of each matter with the assistance of outside legal counsel and, if applicable, other experts. Included in these other matters is the following:

Venator Materials plc v. Tronox Limited. In May 2019, Venator Materials plc (“Venator”) filed an action in the Superior Court of the State of Delaware alleging among other things that we owed Venator a \$75 million “Break Fee” pursuant to the terms of a preliminary agreement dated July 14, 2018 (the “Exclusivity Agreement”). The Exclusivity Agreement required, among other things, Tronox and Venator to use their respective best efforts to negotiate a definitive agreement to sell the entirety of the National Titanium Dioxide Company Limited’s (“Cristal’s”) North American operations to Venator if a divestiture of all or a substantial part of these operations were required to secure the approval of the Federal Trade Commission for us to complete our acquisition of Cristal’s TiO₂ business. In June 2019, we denied Venator’s claims and counterclaimed against Venator seeking to recover \$400 million in damages from Venator that we suffered as a result of Venator’s breaches of the Exclusivity Agreement. Specifically, we alleged, among other things, that Venator’s failure to use best efforts constituted a material breach of the Exclusivity Agreement and directly resulted in and caused us to sell Cristal’s North American operations to an alternative buyer for \$701 million, \$400 million less than the price Venator had agreed to in the Exclusivity Agreement. Though we believe that our interpretation of the Exclusivity Agreement is correct, there can be no assurance that we will prevail in litigation.

21. Accumulated Other Comprehensive Income (Loss) Attributable to Tronox Holdings plc and Other Equity Items

The tables below present changes in accumulated other comprehensive income (loss) by component for 2019, 2018 and 2017.

	<u>Cumulative Translation Adjustment</u>	<u>Pension Liability Adjustment</u>	<u>Unrealized Gains (losses) on Derivatives</u>	<u>Total</u>
Balance, January 1, 2017	\$(408)	\$ (92)	\$ 3	\$(497)
Other comprehensive income (loss).....	96	(6)	(3)	87
Amounts reclassified from accumulated other comprehensive income (loss).....	<u>—</u>	<u>8</u>	<u>(1)</u>	<u>7</u>
Balance, December 31, 2017	\$(312)	\$ (90)	\$(1)	\$(403)
Other comprehensive income (loss).....	(133)	(5)	1	(137)
Amounts reclassified from accumulated other comprehensive income (loss).....	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
Balance, December 31, 2018	\$(445)	\$ (95)	\$—	\$(540)
Other comprehensive income (loss).....	3	(11)	8	—
Acquisition of noncontrolling interest	(61)	—	—	(61)
Amounts reclassified from accumulated other comprehensive income (loss).....	<u>—</u>	<u>2</u>	<u>(7)</u>	<u>(5)</u>
Balance, December 31, 2019	<u>\$(503)</u>	<u>\$(104)</u>	<u>\$ 1</u>	<u>\$(606)</u>

Repurchase of Common Stock

In addition to the repurchase of 14 million shares from Exxaro discussed in Note 24, “Related Parties”, on June 3, 2019, the Company’s Board of Directors authorized the repurchase of up to \$100 million of the Company’s stock. During the year ended December 31, 2019, we purchased 7,453,391 shares under the authorization at an average price of \$11.59 per share and at a cost of approximately \$87 million, including sales commissions and fees. We did not complete the full program given certain Section 382 restrictions related to our NOLs. Upon repurchase of the shares by the Company, the shares were cancelled.

22. Share-based Compensation

Share-based compensation expense consisted of the following:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
Restricted shares and restricted share units	\$32	\$21	\$30
Options	—	—	—
T-Bucks Employee Participation Plan	—	—	1
Total share-based compensation expense (continuing operations) ⁽¹⁾	<u>\$32</u>	<u>\$21</u>	<u>\$31</u>

(1) 2017 excludes \$2 million relating to discontinued operations. See Note 6.

Tronox Holdings plc Amended and Restated Management Equity Incentive Plan

On March 27, 2019, in connection with the Re-domicile Transaction, Tronox Holdings plc assumed the management equity incentive plan previously adopted by Tronox Limited, which plan was renamed the Tronox Holdings plc Amended and Restated Management Equity Incentive Plan. The amendments to the plan were made to provide, among other things, for the appropriate substitution of Tronox Holdings in place of Tronox Limited and to ensure the compliance with the laws of England and Wales law in place of Australian law. The MEIP permits the grant of awards that are comprised of incentive options, nonqualified options, share appreciation rights, restricted shares, restricted share units, performance awards, and other share-based awards, cash payments, and other forms as the compensation committee of the Board of Directors (the “Board”) in its discretion deems appropriate, including any combination of the above. Subject to further adjustment, as of December 31, 2019, the maximum number of shares which may be the subject of awards (inclusive of incentive options) is 20,781,225 ordinary shares.

Restricted Shares

We did not grant any restricted shares during 2019. Restricted shares issued under the MEIP contain non-forfeitable dividend rights. The following table presents a summary of activity for 2019:

	<u>Number of Shares</u>	<u>Weighted Average Grant Date Fair Value</u>
Outstanding, Outstanding, January 1, 2019	81,456	\$ 3.57
Vested	<u>(81,456)</u>	<u>3.57</u>
Outstanding, December 31, 2019	<u>—</u>	<u>\$—</u>
Expected to vest, December 31, 2019	<u>—</u>	<u>\$—</u>

At December 31, 2019, the restricted shares were fully vested. The total fair value of restricted shares that vested during both 2019 and 2018 was less than \$1 million and \$1 million for 2017.

Restricted Share Units (“RSUs”)

During 2017, a total of 1,397,471 RSUs were granted, pursuant to an Integration Incentive Award program (“Integration Incentive Award”) established in connection with the Cristal Transaction, to certain executive officers and managers with significant integration accountability. In addition, during the second quarter of 2018, an additional 139,225 RSUs were granted under the Integration Incentive Award. These RSUs would have vested two years from the date of the close of the Cristal Transaction and the number of shares that would have been issued to grantees would have been based upon the achievement of established performance conditions. Under the original terms of the Integration Incentive Award, if the Cristal Transaction did not close by July 1, 2018, all unvested awards pursuant to the Integration Incentive Award would immediately be canceled and forfeited.

During the second quarter of 2018, terms of the Integration Incentive Award were modified to eliminate the requirement that the Cristal Transaction must close by July 1, 2018. We accounted for this modification as a

Type III modification since, at the modification date, the expectation of the award vesting changed from improbable to probable. As a result, we reversed approximately \$6 million of previously recorded expense related to the Integration Incentive Award. The issued and unvested RSUs under the Integration Incentive Award were revalued based on the closing price of the Company's stock on the modification date and will vest two years from the date the Cristal Transaction closed and based upon the achievement of established performance conditions. As a result, the estimated expense associated with the revalued award is being expensed over the period from the modification date through two years from the date that the Cristal Transaction closed.

During the third and fourth quarter of 2018, an additional 90,161 and 40,161 RSUs, respectively, were granted under the modified terms of the Integration Incentive Award, and during the third and fourth quarter of 2019, 65,387 and 16,750 additional RSUs were granted, respectively. All the integration awards discussed above will vest on April 10, 2021 if performance conditions are met.

In addition to the Integration Incentive Award, during 2019, we granted RSUs which have time and/or performance conditions. Both the time-based awards and the performance-based awards are classified as equity awards.

2019 RSU Grant-For the time-based awards valued at the weighted average grant date fair value, 195,178 RSUs were granted to Board members and vest a ratably over approximate one-year period, 1,311,677 RSUs were granted to management and vest ratably over a twenty-eight to thirty-seven month period ending March 5, 2022, and 3,528 RSUs were granted to certain Board members in lieu of cash fees earned and vested immediately. For the performance based awards, 1,307,927 RSUs were granted to management and cliff vest at the end of thirty-three to thirty-seven month period ending March 5, 2022. Vesting of the performance-based awards is based on a relative Total Shareholder Return ("TSR") calculation compared to a peer group performance over the applicable three-year measurement period. The Company's three-year TSR versus the peer group performance levels determines the payout percentage. The TSR metric is considered a market condition for which we use a Monte Carlo simulation to determine the grant date fair value of \$12.65. The 2016 performance RSUs vested above target in 2019 and resulted in 687,485 RSUs additional shares being granted and vested immediately.

Similar TSR awards were granted during 2018 and 2017 with grant date fair values of \$20.80 and \$20.68, respectively, which were calculated utilizing a Monte Carlo simulation. The following weighted-average assumptions were utilized to value the grants in 2019, 2018 and 2017:

	<u>2019</u>	<u>2018</u>	<u>2017</u>
Dividend yield	N/A	N/A	1.37%
Expected historical volatility	67.20%	80.40%	74.40%
Risk free interest rate	2.50%	2.32%	1.51%
Expected life (in years)	3	3	3

The following table presents a summary of activity for RSUs for 2019:

	<u>Number of Shares</u>	<u>Weighted Average Grant Date Fair Value</u>
Outstanding, Outstanding, January 1, 2019	5,336,433	\$12.92
Granted	3,587,932	10.81
Vested	(3,266,534)	6.13
Forfeited	<u>(100,172)</u>	<u>13.81</u>
Outstanding, December 31, 2019	<u>5,557,659</u>	<u>\$15.19</u>
Expected to vest, December 31, 2019	<u>5,469,633</u>	<u>\$15.57</u>

At December 31, 2019, there was \$40 million of unrecognized compensation expense related to nonvested RSUs, adjusted for estimated forfeitures, which is expected to be recognized over a weighted-average period of 2.0 years. The weighted-average grant-date fair value of RSUs granted during 2019, 2018 and 2017 was \$10.81 per unit, \$19.23, and \$17.55 per unit, respectively. The total fair value of RSUs that vested during 2019, 2018 and 2017 was \$20 million, \$17 million and \$23 million, respectively.

Options

The fair value of options granted is determined on the grant date using the Black-Scholes option-pricing model and is recognized in earnings on a straight-line basis over the employee service period of three years, which is the vesting period. The assumptions used in the Black-Scholes option-pricing model on the grant date are based on (i) a fair value using the closing price of our Ordinary Shares on the grant date, (ii) a risk-free interest rate based on U.S. Treasury Strips available with a maturity period consistent with the expected life assumption, (iii) an expected volatility assumption based on historical price movements of our peer group, and (iv) a dividend yield determined based on the Company's expected dividend payouts. We did not issue any options during 2019 and 2018 and all our options outstanding are fully vested at December 31, 2019.

The following table presents a summary of option activity for 2019:

	<u>Number of Options</u>	<u>Weighted Average Exercise Price</u>	<u>Weighted Average Contractual Life (years)</u>	<u>Intrinsic Value</u>
Outstanding, January 1, 2019.....	1,319,743	\$21.53	4.16	\$—
Exercised	—	—		
Forfeited	—	—		
Expired	<u>(58,841)</u>	<u>21.34</u>		
Outstanding and Exercisable, December 31, 2019	<u>1,260,902</u>	<u>\$21.54</u>	<u>3.18</u>	<u>\$—</u>

The aggregate intrinsic values in the table represent the total pre-tax intrinsic value (the difference between our share price at the indicated dates and the options' exercise price, multiplied by the number of in-the-money options) that would have been received by the option holders had all option holders exercised their in-the-money options at the end of the year. The amount will change based on the fair market value of our stock. There were no options exercised during 2019 and consequently there was no related intrinsic value. Total intrinsic value of options exercised during 2018 and 2017 was less than \$1 million and \$1 million, respectively. We issue new shares upon the exercise of options. During 2018, we received \$4 million, in cash for the exercise of stock options. At both December 31, 2019 and 2018, there was no unrecognized compensation expense related to options.

23. Pension and Other Postretirement Healthcare Benefits

The following provides information regarding our U.S. and foreign plans:

U.S. Plans

Pension Plans — Tronox has two main U.S. defined benefit plans: the U.S. Qualified Plan and the U.S. Pension Plan (which was acquired as part of the Cristal acquisition). The U.S. Qualified Plan is a funded noncontributory qualified benefit plan which is in accordance with the Employee Retirement Income Security Act of 1974 ("ERISA") and the Internal Revenue Code. We made contributions into funds managed by a third party, and those funds are held exclusively for the benefit of the plan participants. Benefits under the U.S. Qualified Plan were generally calculated based on years of service and final average pay. The U.S. Qualified Plan was frozen and closed to new participants on June 1, 2009. Benefits under the U.S. Pension Plan are generally calculated based on years of credited service and average compensation as defined under the respective plan provisions. The U.S. Pension Plan is funded through contributions to a pension trust fund, generally subject to minimum funding requirements. As a result of the INEOS transaction, all active participants that moved to INEOS were terminated from the U.S. Pension Plan and became 100% vested with no further benefits accruing to those participants.

Postretirement Healthcare Plans — As part of the Cristal acquisition, we assumed liability for the Cristal U.S. retiree welfare plan. Additionally, in prior periods, we also maintained a U.S. postretirement healthcare plan which we settled in 2015 which resulted in a settlement gain of \$3 million which had been deferred to "Accumulated other comprehensive loss" in the Consolidated Balance Sheet as settlement accounting requirements were deemed not fully satisfied. During 2018, we released the \$3 million from "Accumulated other comprehensive loss" and recorded such amount in "Other income (expense), net" in the Consolidated Statement of Operations.

International Plans

Pension Plans — Tronox has international defined benefit commitments primarily in the United Kingdom and Saudi Arabia. As part of the Cristal acquisition, we assumed liability for a funded qualified defined benefit plan in the United Kingdom (“U.K. DB Scheme”). This plan is frozen with no additional benefits accruing to the participants. Benefits under the UK DB Scheme are generally calculated based on years of credit service and average compensation as defined under the plan provisions. Additionally, as part of the Cristal acquisition, we assumed liability of the Saudi Arabia Cristal End of Service Benefit plan which provides end of service benefits to qualifying participants. End of service benefits are based on years of service and the reasons for which a participant’s services to the Company are terminated.

Multiemployer Pension Plan - In prior periods, we maintained a defined benefit plan in the Netherlands (the “Netherlands Plan”) to provide defined pension benefits to qualifying employees of Tronox Pigments (Holland) B.V. and its related companies. During 2014, the Netherlands Plan was replaced with a multiemployer plan, the Netherlands Contribution Plan (the “CDC Plan”) effective January 1, 2015. Under the CDC Plan, employees earn benefits based on their pensionable salaries each year determined using a career average benefit formula. The collective bargaining agreement between us and the participants require us to contribute 21.2% of the participants’ pensionable salaries into a pooled fund administered by the industrywide PGB. The pensionable salary is the annual income of employees subject to a cap, which is adjusted each year to reflect the current requirements of the Netherlands’ Wages and Salaries Tax Act of 1964. Our obligation under this plan is limited to the fixed percentage contribution we make each year. The employees are entitled to any returns generated from the investment activities of the fund.

The following table outlines the details of our participation in the CDC Plan for the year ended December 31, 2019. The CDC disclosures provided herein are based on the fund’s 2018 annual report, which is the most recently available public information. Based on the total plan assets and accumulated benefit obligation information in the plan’s annual report, the zone status was green as of December 31, 2018. A green zone status indicates that the plan was at least 80 percent funded. The “FIP/RP Status Pending/Implemented” column indicates whether a financial improvement plan (FIP) or a rehabilitation plan (RP) is either pending or has been implemented. As of December 31, 2019, we are not aware of any financial improvement or rehabilitation plan being implemented or pending. The last column lists the expiration date of the collective-bargaining agreement to which the plan is subject.

<u>Pension Fund</u>	<u>EIN/Pension Plan Number</u>	<u>Pension Protection Act Zone Status</u>		<u>FIP/RP Pending/Implemented</u>	<u>Tronox Contributions</u>			<u>Expiration date of Collective-Bargaining Agreement</u>
		<u>2019</u>	<u>2018</u>		<u>2019</u>	<u>2018</u>	<u>Surcharge Imposed</u>	
PGB	NA	N/A	Green	No	\$4	\$4	No	12/31/2024

On the basis of the information available in the CDC Plan 2018 annual report, our contribution does not constitute more than 5 percent of the total contribution to the plan by all participants. During 2019, the fund did not impose any surcharge on us.

Postretirement Healthcare Plans — We also maintain postretirement healthcare plans in South Africa and Brazil. As part of the 2012 Exxaro Transaction, we established a post-employment healthcare plan, which provides medical and dental benefits to certain South African employees, retired employees and their registered dependents (the “South African Plan”). The South African Plan provides benefits as follows: (i) members employed before March 1, 1994 receive 100% post-retirement and death-in-service benefits; (ii) members employed on or after March 1, 1994 but before January 1, 2002 receive 2% per year of completed service subject to a maximum of 50% post-retirement and death-in-service benefits; and, (iii) members employed on or after January 1, 2002 receive no post-retirement and death-in-service benefits. As a result of the Cristal acquisition, we assumed liability for a post-retirement medical plan in Brazil (the “Brazil Medical Plan”). The Brazil Medical Plan provides post-employment medical benefits to employees who contributed to the medical plan while employed. Retirees receiving a benefit under the plan are required to pay a contribution that varies based on the coverage level elected.

Pension and Postretirement Benefit Costs / Obligations

Benefit Obligations and Funded Status — The following provides a reconciliation of beginning and ending benefit obligations, beginning and ending plan assets, funded status, and balance sheet classification of our U.S. and international pension plans and other post-retirement benefit plans (“OPEB”) as of and for the years ended December 31, 2019 and 2018. The benefit obligations and plan assets associated with our principal benefit plans are measured on December 31.

	Pensions			Other Post Retirement Benefit Plans		
	December 31			December 31		
	2019	2018	2018	2019	2018	
	US	International	US	US	International	International
<i>Change in benefit obligations:</i>						
Benefit obligation, beginning of year	\$329	\$ —	\$377	\$—	\$ 7	\$ 8
Service cost	1	3	—	—	—	—
Interest cost	16	4	13	—	1	1
Net actuarial (gains) losses	36	6	(27)	—	2	(1)
Acquisition, net ⁽¹⁾	106	230	—	2	3	—
Settlements	(59)	(3)	—	—	—	—
Foreign currency rate changes	—	2	—	—	—	(1)
Benefits paid	(31)	(10)	(30)	—	—	—
Administrative expenses	—	—	(4)	—	—	—
Benefit obligation, end of year ⁽²⁾	<u>398</u>	<u>232</u>	<u>329</u>	<u>2</u>	<u>13</u>	<u>7</u>
<i>Change in plan assets:</i>						
Fair value of plan assets, beginning of year . . .	243	—	282	—	—	—
Actual return on plan assets	51	6	(17)	—	—	—
Acquisition, net ⁽¹⁾	105	184	—	—	—	—
Employer contributions	10	7	12	—	—	—
Benefits paid	(31)	(10)	(30)	—	—	—
Foreign currency rate changes	—	2	—	—	—	—
Settlements	(59)	(3)	—	—	—	—
Administrative expenses	—	—	(4)	—	—	—
Fair value of plan assets, end of year	<u>319</u>	<u>186</u>	<u>243</u>	<u>—</u>	<u>—</u>	<u>—</u>
Net underfunded status of plans	<u>\$ (79)</u>	<u>\$ (46)</u>	<u>\$ (86)</u>	<u>\$ (2)</u>	<u>\$ (13)</u>	<u>\$ (7)</u>
<i>Classification of amounts recognized in the Consolidated Balance Sheets:</i>						
Other long-term assets	\$ 6	\$ 20	\$ —	\$—	\$ —	\$—
Accrued liabilities	—	(6)	—	—	—	—
Pension and postretirement healthcare benefits	(85)	(60)	(86)	(2)	(13)	(7)
Total liabilities	(85)	(66)	(86)	(2)	(13)	(7)
Accumulated other comprehensive (income) loss	<u>96</u>	<u>4</u>	<u>95</u>	<u>—</u>	<u>1</u>	<u>—</u>
Total	<u>\$ 17</u>	<u>\$ (42)</u>	<u>\$ 9</u>	<u>\$ (2)</u>	<u>\$ (12)</u>	<u>\$ (7)</u>

(1) Represents the assets and benefit obligations assumed as part of the Cristal Transaction. Such plan assets and benefit obligations were remeasured as of the merger date and all subsequent activity through December 31, 2019 is presented within the respective captions above.

(2) Since the benefits under the U.S. Qualified Plan are frozen, the projected benefit obligation and accumulated benefit obligation are the same.

Contributions

At a minimum, Tronox contributes to its pension plans to comply with local regulatory requirements (e.g., ERISA in the United States). Discretionary contributions in excess of the local minimum requirements are made based on many factors, including long-term projections of the plans' funded status, the economic environment, potential risk of overfunding, pension insurance costs and alternative uses of the cash. Changes to these factors can impact the timing of discretionary contributions from year to year. Pension contributions were \$12 million in 2019 and estimated required contributions for 2020 are currently expected to be approximately \$16 million.

The following table provides information for pension plans where the accumulated benefit obligation exceeds the fair value of the plan assets:

	Pensions	
	2019	
	US	International
Projected benefit obligation (PBO)	\$351	\$67
Accumulated benefit obligation (ABO)	\$351	\$44
Fair value of plan assets	\$268	\$—

Expected Benefit Payments — The following table shows the expected cash benefit payments for the next five years and in the aggregate for the years 2025 through 2029:

	2020	2021	2022	2023	2024	2025-2029
Pensions - US	\$31	\$31	\$31	\$29	\$29	\$131
Pensions - International	\$12	\$ 9	\$ 9	\$11	\$12	\$ 61
Other Post Retirement Benefit Plans - US	\$—	\$—	\$—	\$—	\$—	\$ 1
Other Post Retirement Benefit Plans - International	\$—	\$—	\$—	\$ 1	\$ 1	\$ 3

Retirement and Postretirement Healthcare Expense — The table below presents the components of net periodic cost associated with the U.S. and foreign plans recognized in the Consolidated Statements of Operations for 2019, 2018, and 2017:

	Pensions			Other Postretirement Benefit Plans		
	Year Ended December 31,			Year Ended December 31,		
	2019	2018	2017	2019	2018	2017
Net periodic cost:						
Service cost	\$ 4	\$ —	\$ —	\$—	\$—	\$—
Interest cost	21	13	15	1	1	1
Expected return on plan assets	(22)	(15)	(15)	—	—	—
Net amortization of actuarial loss	2	3	3	—	—	—
Settlement losses (gains) ⁽¹⁾	(1)	—	—	—	(3)	—
Total net periodic cost - continuing operations	<u>\$ 4</u>	<u>\$ 1</u>	<u>\$ 3</u>	<u>\$ 1</u>	<u>\$ (2)</u>	<u>\$ 1</u>

(1) Recorded in Other income (expense), net in the Consolidated Statement of Operations.

Assumptions —

The following weighted average assumptions were used to determine net periodic cost:

	Pension				OPEB			
	2019		2018	2017	2019		2018	2017
	US	International	US	US	US	International	International	International
Discount rate	4.34%	2.50%	3.71%	4.25%	4.00%	10.25%	11.54%	10.87%
Expected return on plan assets	5.69%	3.00%	5.64%	5.64%	N/A	N/A	N/A	N/A

The following weighted average assumptions were used in estimating the actuarial present value of benefit obligations:

	Pensions				OPEB			
	2019		2018	2017	2019		2018	2017
	US	International	US	US	US	International	International	International
Discount rate	3.39%	1.98%	4.40%	3.71%	3.36%	9.91%	11.38%	11.54%
Rate of compensation increase	3.00%	4.67%	N/A	N/A	N/A	N/A	N/A	N/A

For the U.S. Qualified Plan and the U.S. Pension Plan, the mortality assumption was updated on December 31, 2019 to use the Society of Actuaries' most recently published generational projection scale (i.e. MP-2019) and base table (i.e. Pri-2012). The mortality improvement scale that had been used in as of December 31, 2018 was the MP-2018 projection scale and the base table was RP-2014. This update to our mortality assumption resulted in a decrease of \$1 million to our projected benefit obligation as compared to December 31, 2018.

Expected Return on Plan Assets — In forming the assumption of the U.S. and international long-term rate of return on plan assets, we considered the expected earnings on funds already invested, earnings on contributions expected to be received in the current year, and earnings on reinvested returns. The long-term rate of return estimation methodology for the Company's pension plans is based on a capital asset pricing model using historical data and a forecasted earnings model. An expected return on plan assets analysis is performed which incorporates the current portfolio allocation, historical asset-class returns, and an assessment of expected future performance using asset-class risk factors.

Discount Rate — The 2019 rates were selected based on the results of a cash flow matching analysis, which projected the expected cash flows of the plans using a yield curves model developed from a universe of Aa-graded U.S. currency corporate bonds (obtained from Bloomberg) with BVAL scores of 6 or greater. The 2018 rates were similarly selected with the exception of the use of BVAL scores as a selection criteria. Bonds with features that imply unreliable pricing, a less than certain cash flow, or other indicators of optionality are filtered out of the universe. The remaining universe is categorized into maturity groups, and within each of the maturity groups yields are ranked into percentiles.

Plan Assets — The investments of the U.S. and International pension plans are managed to meet the future expected benefit liabilities of the plan over the long term by investing in diversified portfolios consistent with prudent diversification and historical and expected capital market returns. Tronox's U.S. and international pension plans' weighted-average asset allocations at December 31, 2019 and 2018, and the target asset allocation ranges, by major asset category, are as follows:

	December 31,					
	2019				2018	
	US		International		US Qualified Plan	
	Actual	Target	Actual	Target	Actual	Target
Equity securities	50%	49%	7%	4%	50%	50%
Debt securities	48	48	26	25	48	48
Real estate	1	—	—	—	—	—
Other	1	3	67	71	2	2
Total	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

The fair values of pension investments as of December 31, 2019 are summarized below:

	Fair Value Measurement at December 31, 2019 Using:			Total
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	
Asset category:				
Equities securities:				
Global equity securities	\$ 68 ⁽¹⁾	\$—	\$ —	\$ 68
Global comingled equity funds	104 ⁽²⁾	—	—	104
Debt securities:				
US government bonds	69 ⁽³⁾	—	—	69
Foreign government bonds	34 ⁽³⁾	—	—	34
US corporate bonds	—	79 ⁽⁴⁾	—	79
Foreign corporate bonds	16 ⁽⁵⁾	6 ⁽⁴⁾	—	22
Real Estate:				
Property/ real estate fund	—	1 ⁽⁶⁾	—	1
Other:				
Insurance contracts	—	—	104 ⁽⁹⁾	104
Alternative investments	— ⁽⁷⁾	1 ⁽⁷⁾	—	1
Cash & cash equivalents	23 ⁽⁸⁾	—	—	23
Total at fair value	<u>\$314</u>	<u>\$87</u>	<u>\$104</u>	<u>\$505</u>

- (1) For global equity securities, this category is comprised of shares of common stock in both U.S. and international companies from a diverse set of industries and size. Common stock is valued at the closing market price reported on a U.S. or international exchange where the security is actively traded. Equity securities are classified within level 1 of the fair value hierarchy.
- (2) Global comingled equity funds are comprised of managed funds that invest in common stock of both U.S. and international companies shares from a diverse set of industries and size. Common stock are valued at the closing market price reported on a U.S. or international exchange where the security is actively traded. These funds are classified within level 1 of the fair value hierarchy.
- (3) For US and foreign government bonds, this category includes U.S. treasuries, U.S. federal agency obligations and international government debt. The fair value of these investments are based on observable quoted prices on active exchanges, which are level 1 inputs.
- (4) For US corporate bonds and a portion of foreign corporate bonds, this category is comprised of corporate bonds of U.S. and foreign companies from a diverse set of industries and size. The fair values for the U.S. and foreign corporate bonds are determined using quoted prices of similar securities in active markets and observable data or broker or dealer quotations. The fair values for these investments are classified as level 2 within the valuation hierarchy.
- (5) For certain foreign corporate bonds, the category is comprised of corporate bonds of foreign companies from a diverse set of industries and size. The fair value is based on observable quoted prices on active exchanges, which are level 1 inputs.
- (6) For property / real estate funds, this category includes real estate properties, partnership equities and investments in operating companies. The fair value of the assets is determined using discounted cash flows by estimating an income stream for the property plus a reversion into a present value at a risk adjusted rate. Yield rates and growth assumptions utilized are derived from market transactions as well as other financial and industry data. The fair value of these investments are classified as level 2 in the valuation hierarchy.
- (7) For alternative investments, this category is comprised of investments in alternative mutual funds whose holdings include liquid securities, cash and derivatives. Such funds focus on diversification and employ a variety of investing strategies including long/short equity, multi-strategy, and global macro. The fair value of these investments is determined by reference to the net asset value of the underlying holdings of the fund, which can be determined using observable data (e.g. indices, yield curves, quoted prices of similar securities), and is classified within level 2 of the valuation hierarchy.
- (8) Cash and cash equivalents include cash and short-interest bearing investments with maturities of three months or less. Investments are valued at cost plus accrued interest. Cash and cash equivalents are classified within level 1 of the valuation hierarchy.
- (9) For insurance contracts, the fair value is estimated as the cost of purchasing equivalent annuities on terms consistent with those currently available in the market. The contracts are with highly rated insurance companies and are classified within level 3 of the valuation hierarchy. The following table summarizes changes in fair value of the pension plan assets classified as level 3 for the year ended December 31, 2019:

	<u>Insurance Contracts</u>
Balance, December 31, 2018	\$ —
Actual return on plan assets	2
Acquisitions	101
Transfers in/out of Level 3	—
Foreign currency translation	1
Balance, December 31, 2019	<u>\$104</u>

The fair values of pension investments as of December 31, 2018 are summarized below:

	U.S. Qualified Plan			Total
	Fair Value Measurement at December 31, 2018, Using:			
Asset category:	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	
Commingled Equity Funds	\$ 67 ⁽¹⁾	\$—	\$—	\$ 67
Equity Securities	54 ⁽²⁾	—	—	54
Debt securities:				
Corporate	—	56 ⁽³⁾	—	56
Government	61 ⁽⁴⁾	—	—	61
Cash & cash equivalents:				
Commingled cash equivalents fund	5 ⁽⁵⁾	—	—	5
Total at fair value	<u>\$187</u>	<u>\$56</u>	<u>\$—</u>	<u>\$243</u>

- (1) For commingled equity funds owned by the funds, fair value is based on observable quoted prices on active exchanges, which are level 1 inputs.
- (2) For corporate related debt securities, the fair value is based on observable inputs of comparable market transactions, which are level 2 inputs.
- (3) For corporate related debt securities, the fair value is based on observable inputs of comparable market transactions, which are level 2 inputs.
- (4) For commingled cash equivalents funds, fair value is based on observable quoted prices on active exchanges, which are level 1 inputs.

Defined Contribution Plans

U.S. Savings Investment Plan

In 2006, we established the U.S. Savings Investment Plan (the “SIP”), a qualified defined contribution plan under section 401(k) of the Internal Revenue Code. Under the SIP, our regular full-time and part-time employees contribute a portion of their earnings, and we match these contributions up to a predefined threshold. Our matching contribution is 100% of the first 6% of employee contributions. Effective January 1, 2013, we established a profit sharing contribution at 6% of employees’ pay (“discretionary contribution”). The discretionary contribution is subject to our Board of Directors’ approval each year. The Board approved discretionary contribution of 6% of pay for 2019, 2018 and 2017. Our matching contribution to the SIP vests immediately; however, our discretionary contribution is subject to vesting conditions that must be satisfied over a three-year vesting period. Contributions under the SIP, including our match, are invested in accordance with the investment options elected by plan participants. Compensation expenses associated with our matching contribution to the SIP was \$4 million, \$4 million and \$4 million during 2019, 2018 and 2017, respectively, which was included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations. Compensation expense associated with our discretionary contribution was \$4 million in 2019, \$5 million in 2018 and \$5 million in 2017, which was included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.

U.S. Benefit Restoration Plan

In 2006, we established the U.S. Benefit Restoration Plan (the “BRP”), a nonqualified defined contribution plan, for employees whose eligible compensation is expected to exceed the IRS compensation limits for qualified plans. Under the BRP, participants can contribute up to 20% of their annual compensation and incentive. Our matching contribution under the BRP is the same as the SIP. Our matching contribution under this plan vests immediately to plan participants. Contributions under the BRP, including our match, are invested in accordance with the investment options elected by plan participants. Compensation expense associated with our matching contribution to the BRP was \$2 million during 2019, and \$1 million during each 2018 and 2017 which was included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.

24. Related Party Transactions

Exxaro

At December 31, 2019, Exxaro continues to own approximately 14.7 million shares of Tronox, or a 10.4% ownership interest, as well as their 26% ownership interest in our South African operating subsidiaries.

We had service level agreements with Exxaro for research and development that expired during the third quarter of 2018. Such service level agreements amounted to expenses of \$1 million each during 2018 and 2017 which was included in “Selling general and administrative expense” in the Consolidated Statements of Operations. Additionally, we had a professional service agreement with Exxaro related to the Fairbreeze construction project, which ended in January 2017. We made payments to Exxaro of less than \$1 million during 2018, which were capitalized in “Property, plant and equipment, net” in our Consolidated Balance Sheets. At December 31, 2019 there was no related party payables with respect to the Fairbreeze construction project and at December 31, 2018 we had less than \$1 million of related party payables, which were recorded in “Accounts payable” in our Consolidated Balance Sheets.

On November 26, 2018, we, certain of our subsidiaries and Exxaro entered into the Completion Agreement. The Completion Agreement provides for the orderly sale of Exxaro’s remaining ownership interest in us, subject to market conditions, helped to facilitate the Re-domicile Transaction, as well as addressed several legacy issues related to our 2012 acquisition of Exxaro’s mineral sands business. Pursuant to the terms of the Completion Agreement, Tronox has covenanted to pay Exxaro an amount equal to any South African capital gains tax assessed on Exxaro in respect of any profit arising to it on a disposal of any of its ordinary shares subsequent to the Re-domicile Transaction where such tax would not have been assessed but for the Re-domicile Transaction. Similarly, Exxaro has covenanted to pay Tronox an amount equal to any South African tax savings Exxaro may realize in certain situations from any tax relief that would not have arisen but for the Re-domicile Transaction.

Pursuant to the terms of the Completion Agreement, on May 9, 2019, Exxaro exercised their right under the agreement to sell 14 million shares to us for an aggregate purchase price of approximately \$200 million or \$14.3185 per share, plus fees of approximately \$1 million. The share price was based upon a 5% discount to the 10 day volume weighted average price as of the day that Exxaro exercised their sale notice to us. Upon repurchase of the shares by the Company, the shares were cancelled. As a result of the sale of the 14 million shares on May 9, 2019, we recorded a liability of approximately \$4 million which is included in “Accrued liabilities” in our Consolidated Balance Sheets as of December 31, 2019 and which was subsequently paid in January 2020.

At the present time, we are unable to reasonably determine when and if Exxaro will sell its remaining shares in the foreseeable future, and as a result, we are not able to estimate what the capital gains tax impacts would be should Exxaro sell its remaining shares.

Tasnee/Cristal

On April 10, 2019, we announced the completion of the acquisition of the TiO₂ business of Cristal for \$1.675 billion of cash, subject to a working capital and noncurrent liability adjustment, plus 37,580,000 ordinary shares. At December 31, 2019, Cristal International Holdings B.V. (formerly known as Cristal Inorganic Chemical Netherlands Cooperatief W.A.), a wholly-owned subsidiary of Tasnee, continues to own 37,580,000 shares of Tronox, or a 26% ownership interest. In February 2020, Tronox and Cristal resolved the working capital and noncurrent liability adjustment by agreeing that no payment was required by either party.

On May 9, 2018, we entered into an Option Agreement with AMIC which is owned equally by Tasnee and Cristal. Under the terms of the Option Agreement, AMIC granted us an option (the “Option”) to acquire 90% of a special purpose vehicle (the “SPV”), to which AMIC’s ownership in a titanium slag smelter facility (the “Slagger”) in The Jazan City for Primary and Downstream Industries in KSA will be contributed together with \$322 million of AMIC indebtedness (the “AMIC Debt”). As of December 31, 2019, we have loaned \$89 million for capital expenditures and operational expenses to facilitate the start-up of the Slagger and we have recorded this loan payment and related interest of \$3 million within “Other long-term assets” on the Consolidated Balance Sheet at December 31, 2019. The Option did not have a significant impact on the financial statements as of or for the year ended December 31, 2019.

Prior to the Cristal acquisition, we also acquired feedstock from AMIC for consumption in production. As of December 31, 2019, we had purchased \$11 million of feedstock from AMIC and all payables had been settled as

of December 31, 2019. In addition, Tronox sells Titanium Tetrachloride (TiCl₄) to AMIC for use at a sponge plant facility. During the year ended December 31, 2019, Tronox recorded \$5 million for TiCl₄ product sales made to AMIC and such amounts were recorded in “Net sales” on the Consolidated Statement of Operations.

On December 29, 2019, we entered into an agreement, subject to regulatory approval, with Cristal to acquire certain assets co-located at our Yanbu facility that had been not included in the Cristal Transaction and which assets produce metal grade TiCl₄ for a \$36 million note payable. Under such agreement, the metal grade TiCl₄ will be purchased by Advanced Metal Industries Cluster and Toho Titanium Metal Co. Ltd (ATTM), a joint venture between AMIC and Toho Titanium Company Ltd. ATTM uses the TiCl₄, which we supply by pipeline, for the production of titanium sponge. We expect this transaction to close in the first half of 2020.

In conjunction with the acquisition on April 10, 2019, we entered into a transition services agreement with Tasnee, Cristal and AMIC. Under the terms of the transition services agreement, Tasnee and its affiliates will provide services to Tronox related to information technology support and infrastructure, logistics, safety, health and environmental, treasury and tax. Similarly, Tronox will provide services to Tasnee and its affiliates for information technology support and infrastructure, finance and accounting, tax, treasury, human resources, logistics, research and development and business development.

As part of the transition services agreement, Tronox recorded approximately \$4 million as reduction of “Selling, general and administrative expenses for the year ended December 31, 2019. Under the acquisition agreement, the stamp duty taxes were agreed to be shared. During the year ended December 31, 2019, Tronox paid \$3 million on behalf of Tasnee related to stamp duty taxes. This amount is recorded as a reduction of the total stamp duty taxes paid in “Selling, general and administrative expenses” in the Consolidated Statement of Operations. During 2019, Tasnee prepaid insurance on Tronox’s behalf, of which \$1 million was expensed to “Cost of goods sold” on the Company’s Consolidated Statement of Operations. At December 31, 2019, Tronox had a receivable due from Tasnee of \$14 million and a payable due to Tasnee of \$7 million that are recorded within “Prepaid and other assets” and “Accrued liabilities”, respectively, on the Consolidated Balance Sheet primarily relate to pre-acquisition activity and are expected to be settled in the near term.

25. Segment Information

Prior to and after the Cristal Transaction, we operate our business under one operating segment, TiO₂, which is also our reportable segment. The Company’s chief operating decision maker, who is its CEO, reviews financial information presented at the TiO₂ level for purposes of allocating resources and evaluating financial performance. Since we operate our business under one segment, there is no difference between our consolidated results and segment results.

We disaggregate revenue from contracts with customers by product type and geographic area as well as sales based on country of production. We believe this level of disaggregation appropriately depicts how the nature, amount, timing and uncertainty of our revenue and cash flows are affected by economic factors and reflects how our business is managed.

During 2019, 2018 and 2017 our ten largest third-party TiO₂ customers represented 31%, 37%, and 35%, respectively, of our consolidated net sales. During 2019, 2018, and 2017, no single customer accounted for 10 % of our consolidated net sales.

Net sales to external customers based on country of production, were as follows:

	<u>Year Ended December 31,</u>		
	<u>2019</u>	<u>2018</u>	<u>2017</u>
U.S. operations	\$ 676	\$ 685	\$ 663
International operations:			
United Kingdom	218	—	—
Australia	674	444	452
South Africa	370	444	350
Other - international	<u>704</u>	<u>246</u>	<u>233</u>
Total net sales	<u>\$2,642</u>	<u>\$1,819</u>	<u>\$1,698</u>

See Note 5 for further information on revenues.

There is no difference between the total consolidated assets of continuing operations and our segment assets. Property, plant and equipment, net, mineral leaseholds, net, and lease right of use assets, net by geographic region, were as follows:

	<u>December 31,</u>	
	<u>2019</u>	<u>2018</u>
U.S. operations	\$ 255	\$ 176
International operations:		
United Kingdom	93	—
Saudi Arabia	215	—
South Africa	799	782
Australia	1,109	802
Other - international	<u>244</u>	<u>40</u>
Total	<u>\$2,715</u>	<u>\$1,800</u>

26. Quarterly Results of Operations (Unaudited)

The following represents our unaudited quarterly results for the years ended December 31, 2019 and 2018. These quarterly results were prepared in conformity with generally accepted accounting principles and reflect all adjustments that are, in the opinion of management, necessary for a fair statement of the results, and were of a normal recurring nature.

Unaudited quarterly results for the year ended December 31, 2019:

	<u>1st Quarter</u>	<u>2nd Quarter⁽¹⁾</u>	<u>3rd Quarter⁽¹⁾</u>	<u>4th Quarter</u>
Net sales	\$ 390	\$ 791	\$ 768	\$693
Cost of goods sold	307	672	635	545
Contract loss	<u>—</u>	<u>19</u>	<u>—</u>	<u>—</u>
Gross profit	83	100	133	148
Net (loss) income from continuing operations	(30)	(55)	(12)	(5)
Net income (loss) from discontinued operations, net of tax	<u>—</u>	<u>(1)</u>	<u>6</u>	<u>—</u>
Net (loss) income	(30)	(56)	(6)	(5)
Net income attributable to noncontrolling interest	<u>4</u>	<u>6</u>	<u>7</u>	<u>(5)</u>
Net loss attributable to Tronox Holdings plc	<u>\$ (34)</u>	<u>\$ (62)</u>	<u>\$ (13)</u>	<u>\$ —</u>
Loss from continuing operations per share, basic and diluted	<u>\$(0.27)</u>	<u>\$(0.41)</u>	<u>\$(0.13)</u>	<u>\$ —</u>
Income from discontinued operations per share, basic and diluted	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 0.04</u>	<u>\$ —</u>

- (1) During the third quarter of 2019, we recorded an out-of-period adjustment of \$7 million to reduce the tax impact of a transaction related to the Cristal acquisition within income from discontinued operations that should have been recorded in the second quarter of 2019. After evaluating the quantitative and qualitative aspects of the adjustments, we concluded the effect of this adjustment, individually and in the aggregate, was not material to our previously issued interim consolidated financial statements and has no effect to our annual 2019 consolidated financial statements.

Unaudited quarterly results for the year ended December 31, 2018:

	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter⁽¹⁾</u>	<u>4th Quarter</u>
Net sales	\$ 442	\$ 492	\$ 456	\$ 429
Cost of goods sold	<u>327</u>	<u>348</u>	<u>335</u>	<u>311</u>
Gross profit	115	144	121	118
Net (loss) income	(41)	50	15	6
Net income attributable to noncontrolling interest	<u>3</u>	<u>14</u>	<u>9</u>	<u>11</u>
Net (loss) income attributable to Tronox Holdings plc⁽¹⁾	<u>\$ (44)</u>	<u>\$ 36</u>	<u>\$ 6</u>	<u>\$ (5)</u>
(Loss) income per share, basic	<u>\$(0.36)</u>	<u>\$0.30</u>	<u>\$0.05</u>	<u>\$(0.05)</u>
(Loss) income per share, diluted	<u>\$(0.36)</u>	<u>\$0.29</u>	<u>\$0.05</u>	<u>\$(0.05)</u>

(1) During the third quarter of 2018, we recorded out-of-period adjustments of \$3 million to increase net income that should have been recorded previously. After evaluating the quantitative and qualitative aspects of the adjustments, we concluded the effect of this adjustment, individually and in the aggregate, was not material to our previously issued interim and annual consolidated financial statements and was not material to our 2018 consolidated financial statements.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Under the supervision of and with the participation of Tronox’s management, including our CEO and CFO, we evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended) (the “Exchange Act”), as of December 31, 2019, the end of the period covered by this report. Based on that evaluation, our CEO and CFO have concluded that the Company’s disclosure controls and procedures were effective as of that date. Tronox’s disclosure controls and procedures are designed to ensure that information required to be disclosed by Tronox in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission’s rules and forms, and that such information is accumulated and communicated to Tronox’s management, including Tronox’s CEO and CFO, or other person performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

Management’s Report on Internal Control Over Financial Reporting

Management of Tronox Holdings plc and its subsidiaries is responsible for establishing and maintaining adequate internal control over financial reporting. Internal controls over financial reporting is a process designed under the supervision of our principal executive and principal financial officers to provide reasonable assurance regarding the reliability of financial reporting and the preparation of the Company’s financial statements for external purposes in accordance with U.S. generally accepted accounting principles.

Our internal controls over financial reporting include those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of the Company’s management and directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Management assessed the effectiveness of our internal controls over financial reporting as of December 31, 2019. In making this assessment, management used the criteria in *Internal Control-Integrated Framework* (2013) set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on our assessment using those criteria, management concluded that our internal control over financial reporting as of December 31, 2019 was effective.

Because of its inherent limitations, internal controls over financial reporting may not prevent or detect misstatements. 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.

Tronox's disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by Tronox in the reports that it files or submits under the Exchange Act is accumulated and communicated to Tronox's management, including Tronox's principal executive and principal financial officers, or other person performing similar functions, as appropriate to allow timely decisions regarding required disclosure. Based on that evaluation, we have concluded that the Company's disclosure controls and procedures were effective as of that date.

We closed the acquisition of Cristal on April 10, 2019, and Cristal's total assets and net sales constituted 38% and 39%, respectively, of our consolidated total assets and net sales as shown on our consolidated financial statements as of and for the year ended December 31, 2019. As the Acquisition occurred in the second quarter of 2019, we excluded Cristal from our assessment of internal control over financial reporting. This exclusion of Cristal from our assessment of internal control over financial reporting is based on guidance issued by the Staff of the Securities and Exchange Commission.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2019 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which appears herein.

Changes in Internal Control Over Financial Reporting

On April 10, 2019, we completed our acquisition of Cristal. Management has considered this transaction material to the results of operations, cash flows and financial position from the date of acquisition through December 31, 2019, and believes that the internal control and procedures of the acquisition may have a material effect on internal control over financial reporting. We are currently in the process of incorporating the internal controls and procedures of Cristal into the internal control over financial reporting.

There have been no other changes to our internal control over financial reporting during the quarter ended December 31, 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information regarding our executive officers, members of the Board of Directors, including its audit committee and audit committee financial experts, as well as information regarding our Code of Ethics and Business Conduct that applies to our Chief Executive Officer and senior financial officers, will be presented in Tronox Holding plc's definitive proxy statement for its 2020 annual general meeting of shareholders, which will be filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, and is incorporated herein by reference.

The information required to be furnished pursuant to this item with respect to compliance with Section 16(a) of the Exchange Act will be set forth under the caption "Section 16(a) Beneficial Ownership Reporting Compliance" in Tronox Holding plc's definitive proxy statement for its 2020 annual general meeting of shareholders, and is incorporated herein by reference.

Item 11. Executive Compensation

Information regarding executive officer and director compensation will be presented in Tronox Holdings plc's definitive proxy statement for its 2020 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, and is incorporated herein by reference.

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

Information regarding security ownership of certain beneficial owners and management and related shareholder matters will be presented in Tronox Holdings plc's definitive proxy statement for its 2020 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, and is incorporated herein by reference.

Equity Compensation Plan Information

The following table provides information as of December 31, 2019 regarding securities issued under the Tronox Holdings plc Amended and Restated Management Equity Incentive Plan (the "Tronox Holdings plc MEIP").

	Number of securities to be issued upon exercise of outstanding restricted shares, restricted share units and options	Weighted-average exercise price of outstanding restricted shares, restricted share units and options	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in the second column) ⁽¹⁾
Equity compensation plans approved by security holders	6,818,561	\$16.36	4,770,192
Equity compensation plans not approved by security holders	—	—	—
Total	<u>6,818,561</u>	<u>\$16.36</u>	<u>4,770,192</u>

(1) Each restricted share unit awarded under the Tronox Holdings plc MEIP was granted at no cost to the persons receiving them and represents the contingent right to receive the equivalent number of ordinary shares.

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

Information regarding certain relationships and related transactions and director independence will be presented in Tronox Holdings plc's definitive proxy statement for its 2020 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

Information regarding principal accounting fees and services will be presented in Tronox Holdings plc's definitive proxy statement for its 2020 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following documents are filed as part of this Annual Report on Form 10-K:

1. Consolidated Financial Statements

Reference is made to the Index to Consolidated Financial Statements and Consolidated Financial Statement Schedules appearing at “Item 8. Financial Statements and Supplementary Data” in this report.

2. Consolidated Financial Statement Schedules

All financial statement schedules are omitted as they are inapplicable, or the required information has been included in the consolidated financial statements or notes thereto.

- 2.1 Transaction Agreement, dated as of February 21, 2017, by and between Cristal, Tronox Limited and Cristal Inorganic Chemicals Netherlands Coöperatief W.A. (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed by Tronox Limited on February 21, 2017).
- 2.2 Amendment No. 1 to Transaction Agreement, dated as of March 1, 2018, by and among The National Titanium Dioxide Company Limited, Tronox Limited and Cristal Inorganic Chemicals Netherlands Coöperatief W.A. (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed by Tronox Limited on March 1, 2018).
- 2.3 Amendment No. 2 to Transaction Agreement dated March 28, 2019, by and among The National Titanium Dioxide Company Limited, Tronox Limited, and, solely for certain purposes, Cristal Inorganic Chemicals Netherlands Coöperatief W.A. (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed on April 2, 2019).
- 2.4 Stock Purchase Agreement, dated as of March 14, 2019, by and among Tronox Limited, INEOS AG and INEOS Joliet US Holdco, LLC (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed on March 19, 2019).
- 3.1 Articles of Association of Tronox Holdings plc (incorporated by reference to Exhibit 3.1 of the Current Report on Form 8-K filed on March 27, 2019).
- 4.1 Indenture, dated as of September 22, 2017 among Tronox Finance plc, the Company and the other guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on September 25, 2017).
- 4.2 Indenture, dated as of April 6, 2018, among Tronox Incorporated, the Company and other guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on April 6, 2018).
- 4.3 First Supplemental Indenture dated as of April 1, 2019 among Tronox Finance plc, the guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.2 of the Quarterly Report on Form 10-Q filed on May 10, 2019).
- 4.4 First Supplemental Indenture dated as of April 1, 2019 among Tronox Incorporated, the guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.3 of the Quarterly Report on Form 10-Q filed on May 10, 2019).
- 4.5 Second Supplemental Indenture dated as of April 12, 2019 among Tronox Finance plc, the guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on April 15, 2019).
- 4.6 Second Supplemental Indenture dated as of April 12, 2019 among Tronox Incorporated, the guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.2 of the Current Report on Form 8-K filed on April 15, 2019).
- 4.7 Third Supplemental Indenture dated as of August 30, 2019 among Tronox Finance plc, the guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on September 3, 2019).
- 4.8 Third Supplemental Indenture dated as of August 30, 2019 among Tronox Incorporated, the guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.2 of the Current Report on Form 8-K filed on September 3, 2019).

- 4.9 Fourth Supplemental Indenture dated as of January 15, 2020 among Tronox Finance plc, the guarantors named therein and Wilmington Trust, National Association, as trustee (filed herewith).
- 4.10 Fourth Supplemental Indenture dated as of January 15, 2020 among Tronox Incorporated, the guarantors named therein and Wilmington Trust, National Association, as trustee (filed herewith).
- 4.11 Specimen ordinary share certificate of Tronox Holdings plc (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on March 27, 2019).
- 4.12 Shareholders Agreement, dated April 10, 2019, by and between Tronox Holdings plc, Cristal Inorganic Chemicals Netherlands Coöperatief W.A., The National Titanium Dioxide Company Limited, Gulf Investment Corporation and Dr. Talal Al-Shair (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on April 11, 2019).
- 4.13 Description of Securities of the Registrant (filed herewith)
- 10.1 Shareholders' Agreement by and between Tronox Sands Holdings PTY Limited, Tronox Limited, Exxaro Resources Limited, Exxaro Sands (Proprietary) Limited and Exxaro TSA Sands Proprietary Limited (incorporated by reference to Exhibit 10.2 of the Current Report on Form 8-K filed on June 20, 2012).
- 10.2 Shareholder's Deed by and between Tronox Holdings plc and Exxaro Resources Limited, dated March 22, 2019 (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on March 27, 2019).
- 10.3* Tronox Holdings plc Amended and Restated Management Equity Incentive Plan (incorporated by reference to Exhibit 10.2 of the Current Report on Form 8-K filed on March 27, 2019).
- 10.4* Tronox Holdings plc Amended and Restated Annual Bonus Incentive Plan (incorporated by reference to Exhibit 10.3 of the Current Report on Form 8-K filed on March 27, 2019).
- 10.5* Employment Agreement entered into as of July 25, 2013 by and between Tronox LLC and Jean Francois Turgeon (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on August 7, 2013).
- 10.6* Amended and Restated Employment Agreement dated as of December 23, 2014 by and between Tronox LLC and John Romano (incorporated by reference to Exhibit 10.1 to the Current Report on Form 8-K filed on December 24, 2014).
- 10.7* Employment Agreement dated as of June 15, 2012 by and between Tronox LLC and Willem Van Niekerk (incorporated by reference to Exhibit 10.29 of the Annual Report on Form 10-K filed on February 26, 2015).
- 10.8* Employment Agreement Extension entered into as of July 13, 2016 by and between Tronox LLC and Jean-Francois Turgeon (incorporated by reference to Exhibit 10.2 to the Current Report on Form 8-K filed on July 15, 2016).
- 10.9* Offer letter, dated November 7, 2019 by and between Tronox Holdings plc and Timothy Carlson (incorporated by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q filed on November 12, 2019).
- 10.10* General form of executive General form of executive officer Time-Based Restricted Share Unit Agreement (filed herewith).
- 10.11* General form of General form of executive officer TSR Performance-Based Restricted Share Unit Agreement (filed herewith).
- 10.12* General form General form of executive officer ORONA Performance-Based Restricted Share Unit Agreement (filed herewith).
- 10.13* General form of Director Grant Restricted Share Unit Agreement (incorporated by reference to Exhibit 10.3 to the Quarterly Report on Form 10-Q filed on May 4, 2017).
- 10.14* General form of Cristal Transaction Integration Synergy Savings Performance-Based Restricted Share Unit Agreement (incorporated by reference to Exhibit 10.4 to the Quarterly Report on Form 10-Q filed on May 4, 2017).

- 10.15 Revolving Syndicated Facility Agreement, dated as of September 22, 2017 among the Company, Tronox US Holdings Inc. and certain of the Company's other subsidiaries along with a syndicate of lenders and Wells Fargo Bank, National Association, as issuing bank, swingline lender, administrative agent, and collateral agent (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on September 25, 2017).
- 10.16 First Lien Term Loan Credit Agreement, dated as of September 22, 2017 among Tronox Finance LLC and its unrestricted subsidiary Tronox Blocked Borrower LLC, and certain of the Company's other subsidiaries, along with a syndicate of lenders and Bank of America, N.A. as administrative agent and collateral agent (incorporated by reference to Exhibit 10.2 of the Current Report on Form 8-K filed on September 25, 2017).
- 10.17* Amended and Restated Employment Agreement dated as of March 28, 2019 by and between the Company and Mr. Jeffrey Quinn (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on April 2, 2019).
- 10.18 Exxaro Mineral Sands Transaction Completion Agreement, dated as of November 26, 2018, by and among Tronox Limited, the other Tronox Parties named therein and Exxaro Resources Limited (incorporated by reference to Exhibit 2.1 to the Current Report on Form 8-K filed on November 28, 2018).
- 10.19* Amendment Agreement to Shareholders' Agreement Relating to Tronox KZN Sands and Tronox Mineral Sands dated November 27, 2018, by and between Tronox Sands Holding PTY Limited, Tronox Limited, Exxaro Resources Limited, Tronox KZN Sands (Proprietary) Limited and Tronox Mineral Sands Proprietary Limited (incorporated by reference to Exhibit 10.22 of the Annual Report on Form 10-K filed on February 28, 2019).
- 10.20* Deed of Amendment to Shareholders' Deed, dated November 27, 2018, by and between Tronox Limited and Exxaro Resources Limited (incorporated by reference to Exhibit 10.23 of the Annual Report on Form 10-K filed on February 28, 2019).
- 10.21 Amendment No. 1 and Waiver to Revolving Syndicated Facility Agreement, dated as of February 26, 2019 among the Company, Tronox US Holdings Inc. and certain of the Company's other subsidiaries along with the party thereto and Wells Fargo Bank, National Association, as administrative agent (incorporated by reference to Exhibit 10.24 of the Annual Report on Form 10-K filed on February 28, 2019).
- 10.22 Amendment No. 1 and Waiver to First Lien Term Loan Credit Agreement, dated as of February 26, 2019 among the Company, Tronox Finance LLC and certain of the Company's other subsidiaries, along with the lenders party thereto and Bank of America, N.A. as administrative agent (incorporated by reference to Exhibit 10.25 of the Annual Report on Form 10-K filed on February 28, 2019).
- 10.23 Consent and Amendment No. 2 to the Revolving Syndicated Facility Agreement, dated as of March 22, 2019, among the Company and certain of the Company's subsidiaries, with the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on March 26, 2019).
- 10.24 Amendment No. 2 to the First Lien Term Loan Credit Agreement, dated as of March 22, 2019, among Tronox Finance LLC, Tronox Blocked Borrower LLC and certain of the Company's other subsidiaries, with the lenders party thereto and Bank of America, N.A. as administrative agent and collateral agent (incorporated by reference to Exhibit 10.2 of the Current Report on Form 8-K filed on March 26, 2019).
- 10.25 Form of Director Deed of Indemnification (incorporated by reference to Exhibit 10.4 of the Current Report on Form 8-K filed on March 27, 2019).
- 10.26 Agreement for the Provision of Depositary Services and Custody Services, dated as of March 14, 2019, in respect of Tronox Holdings plc Depositary Receipts among Computershare Trust Company, N.A., Tronox Holdings plc and Exxaro Resources Limited (incorporated by reference to Exhibit 10.5 of the Current Report on Form 8-K filed on March 27, 2019).

- 10.27 Agreement for the Provision of Depository Services and Custody Services, dated as of April 10, 2019, in respect of Tronox Holdings plc Depository Receipts among Computershare Trust Company, N.A., Tronox Holdings plc, Cristal Inorganic Chemicals Netherlands Coöperatief W.A. and all other holders from time to time of depository receipts issued in accordance herewith (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on April 15, 2019).
- 14.1 Tronox Code of Ethics and Business Conduct, effective March 27, 2019 (filed herewith).
- 21.1 Subsidiaries of Subsidiaries of Tronox Holdings plc. (filed herewith)
- 23.1 Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm for Tronox Holdings plc. (furnished herewith)
- 24.0 Power of Attorney (filed herewith)
- 31.1 Rule 13a-14(a) Certification of Jeffrey N. Quinn. (furnished herewith)
- 31.2 Rule 13a-14(a) Certification of Timothy Carlson. (furnished herewith)
- 32.1 Section 1350 Certification for Jeffrey N. Quinn. (furnished herewith)
- 32.2 Section 1350 Certification for Timothy Carlson. (furnished herewith)
- 101.INS Inline XBRL Instance Document (filed herewith)
- 101.SCH Inline XBRL Taxonomy Extension Schema Document (filed herewith)
- 101.CAL Inline XBRL Taxonomy Extension Calculation Linkbase Document (filed herewith)
- 101.LAB Inline XBRL Taxonomy Extension Label Linkbase Document (filed herewith)
- 101.DEF Inline XBRL Taxonomy Extension Definition Linkbase Document (filed herewith)
- 101.PRE Inline XBRL Taxonomy Extension Presentation Linkbase Document (filed herewith)
- 104 The cover page from the Company's Annual Report on Form 10-K for the year ended December 31, 2019, which has been formatted in Inline XBRL, and included with Exhibit 101.

* Indicates management contract or compensatory plan or arrangement.

Item 16. Form 10-K Summary.

None.

SHAREHOLDER INFORMATION

Tronox Holdings plc is a public limited company incorporated under the laws of England and Wales. We have global operations in North America, South America, Europe, the Middle East, Africa, Asia and Australia.

CORPORATE OFFICES

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This report is made available to shareholders in advance of the annual meeting of shareholders to be held at 9 a.m. EDT, June 24, 2020, in New York, New York. The proxy will be made available to shareholders on or about April 27, 2020, at which time proxies for the meeting will be requested.

Information about Tronox, including financial information, can be found on our website: www.tronox.com.

STOCK LISTING

New York Stock Exchange

TICKER SYMBOL

TROX

TRANSFER AGENT AND REGISTRAR

Computershare Trust Company, N.A.

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web.queries@computershare.com

ELECTRONIC ACCESS

www.proxyvote.com

Copies of the Tronox 2019 Annual Report and proxy statement are available at www.proxyvote.com

A copy of the company's Form 10-K and other filings with the U.S. Securities and Exchange Commission are available at investor.tronox.com/sec.cfm.

CERTIFICATIONS

Tronox has included as Exhibits 31.1, 31.2, 32.1, and 32.2 to its Annual Report on Form 10-K for fiscal year 2019 filed with the Securities and Exchange Commission certificates of its Chief Executive Officer and Chief Financial Officer certifying, among other things, the information contained in the Form 10-K.

Annually, Tronox submits to the New York Stock Exchange (NYSE) a certificate of Tronox's Chief Executive Officer certifying that he was not aware of any violation by Tronox of NYSE corporate governance listing standards as of the date of the certification.

SHAREHOLDER INFORMATION

Our internet site www.tronox.com provides shareholders easy access to Tronox's financial results. Shareholders may also contact Jennifer Guenther, Vice President, Investor Relations at +1 646.960.6598.

Tronox and its operating unit names, logos, and product service designators are either the registered or unregistered trademarks or trade names of Tronox Holdings plc and its subsidiaries.



This paper has been certified to meet the environmental and social standards of the Forest Stewardship Council® (FSC®) and from well-managed forests and other responsible sources.

Our global operations are positioned to meet our customers' needs around the world.

- Tronox Corporate
- Chloride Pigment
- Sulfate Pigment
- Mineral Sands
- Operational Offices

Tronox Holdings plc is a public limited company incorporated under the laws of England and Wales. We are the world's leading integrated manufacturer of TiONA® titanium dioxide pigment. We operate titanium-bearing mineral sand mines and beneficiation and smelting operations in Australia, South Africa and Brazil to produce feedstock materials that can be processed into titanium dioxide for pigment, as well as high-purity titanium chemicals, including titanium tetrachloride and CristalACTiV™ ultrafine titanium dioxide. We consume a substantial part of our feedstock materials in our own pigment facilities in the United States, Australia, Brazil, United Kingdom, France, the Netherlands, China and Saudi Arabia. The mining, beneficiation and smelting of titanium-bearing mineral sands creates meaningful quantities of zircon that we also supply to customers around the world.



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