Tronox Ltd
Form 10-K
February 28, 2019
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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, 2018

OR

o 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 LIMITED
(ACN 153 348 111)
(Exact name of registrant as specified in its charter)

Western Australia, Australia	98-1026700
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
263 Tresser Boulevard, Suite 1100 Stamford, Connecticut 06901	Lot 22 Mason Road Kwinana Beach WA 6167 Australia

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
Class A Ordinary Shares, par value $0.01 per share	New York Stock Exchange

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

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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes o 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 o

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 o

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. o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of large accelerated filer, accelerated filer, smaller reporting company and emerging growth company in Rule 12b-2 of the Exchange Act.

Large accelerated filer		Accelerated filer	o
Non-accelerated filer	o	Smaller reporting company	o
Emerging growth company	o		

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. o

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

The aggregate market value of the ordinary shares held by non-affiliates of the registrant as of June 30, 2018 was approximately $2,418,666,706.

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 o

As of January 31, 2019, the registrant had 94,388,170 shares of Class A ordinary shares and 28,729,280 shares of Class B ordinary shares outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant s proxy statement for its 2019 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.

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FOR THE FISCAL YEAR ENDED DECEMBER 31, 2018
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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, estimate expects, intends, plans, predicts, will, would, could, can, may, and similar terms. These forward-look 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:

- the failure to close the Cristal Transaction (as defined below), including by failure to satisfy closing conditions, and the resulting negative impact on our share price, our business and our financial results;
- if the Cristal Transaction is consummated we may not realize its anticipated benefits, may experience unexpected difficulties integrating its operations and may assume unexpected liabilities;
- if the Cristal Transaction is consummated it will concentrate our share ownership in the hands of Cristal Inorganic and Exxaro (each as defined below), which may result in conflicts of interest and/or prevent minority shareholders from influencing the Company;
- assuming consummation of the Re-Domicile Transaction (as defined below), English law and the new 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 (TiO_2) and feedstock materials, as well as global and regional economic downturns, that adversely affect the demand for our end-use products;
- changes in prices or supply of energy or other raw materials may negatively impact our business;
- 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;

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- 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 potential classification of TiO_2 as a Category 2 Carcinogen in the EU, which could have an adverse impact on our business; and
- the possibility that cybersecurity incidents or other security breaches may seriously impact our results of operations and financial condition.

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 Limited, together with its consolidated subsidiaries (collectively referred to as Tronox or the Company), when discussing the business following the completion of the 2012 Exxaro transaction (as defined herein), and to Tronox Incorporated, together with its consolidated subsidiaries (collectively referred to as Tronox Incorporated), when discussing the business prior to the completion of the Exxaro Transaction.

Item 1. Business

Overview

Tronox Limited is the world s leading integrated manufacturer of titanium dioxide (TiO_2) pigment. We operate titanium-bearing mineral sand mines and accompanying beneficiation and smelting operations in Australia and South Africa to produce feedstock materials that can then be used in the manufacturing process for our TiO_2 pigment products. We consume a substantial part of our feedstock materials in our own TiO_2 pigment facilities located in the United States, Australia and the Netherlands with a goal of delivering low cost, high-quality pigment to our approximately 700 TiO_2 customers in approximately 100 countries. In addition, the mining, beneficiation and smelting of titanium bearing mineral sands creates meaningful quantities of two co-products – zircon and pig iron – which we also supply to customers around the world.

The following chart highlights the TiO2 value chain we participate in:

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The following sets forth the percentage of our revenue derived from sales of our products by geographic region for the year ended December 31, 2018.

The below sets forth the percentage of our revenue derived from sales of our products for the year ended December 31, 2018.

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 3 and 23 of notes to our consolidated financial statements, each included elsewhere in this Form 10-K.

2018 Key Strategic Initiatives

The following sets forth the key strategic initiatives undertaken during 2018 that we believe will set a strong foundation for our future growth and results of operations.

Pending Cristal Acquisition

Throughout 2018 and into 2019 we continued to work diligently on obtaining regulatory approval for our proposed acquisition of the TiO_2 business of The National Titanium Dioxide Company Ltd., a limited company organized under the laws of the Kingdom of Saudi Arabia (Cristal). The transaction was originally announced approximately two years ago when on February 21, 2017, we entered into a definitive agreement with Cristal and one of its affiliates to acquire the TiO_2 business of Cristal for $1.673 billion of cash, subject to a working capital adjustment at closing, plus 37,580,000 Class A Shares (the Cristal Transaction). Our shareholders approved the Cristal Transaction on October 2, 2017 as well as gave us the authority to issue the Class A Shares in connection with the transaction. On February 27, 2019, we agreed with Cristal to extend the date on which our acquisition agreement expires from March 31, 2019 to May 19, 2019.

To date, we have received final approval from eight of the nine regulatory jurisdictions whose approvals are required to close the Cristal Transaction including the European Commission (EC) and are still seeking approval from the U.S. Federal Trade Commission (FTC). With regard to the EC approval, on July 16, 2018, we announced the submittal to the EC of an executed definitive agreement with Venator Materials PLC (Venator) to divest our 8120 paper-laminate product grade (the 8120 Grade) currently supplied to customers from our Botlek facility in the Netherlands. Our agreement with Venator is terminable by either party under certain circumstances if the closing does not occur on or prior to April 12, 2019. On August 20, 2018, the EC approved the Cristal Transaction based on the conclusion that Venator is a suitable buyer of the 8120 Grade. The EC s initial approval required that the Cristal Transaction to be consummated by November 16, 2018 but that deadline has been more recently extended by the EC to May 19, 2019.

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With respect to the FTC, on December 5, 2017, the FTC announced that it would not approve the Cristal Transaction as proposed and filed an administrative action to prevent the parties from consummating the transaction alleging that the Cristal Transaction would violate Section 7 of the Clayton Antitrust Act and Section 5 of the FTC Act. The administrative complaint sought, among other things, a permanent injunction to prevent the transaction from being completed. On December 9, 2018, the administrative law judge (the ALJ) issued an initial decision enjoining Tronox from consummating the proposed Cristal Transaction. We filed an appeal of the administrative law judge s initial decision on February 4, 2019 in which we sought to narrow the geographic scope of the proposed order included in the initial decision. The ALJ s initial decision will not become final until the FTC rules on our appeal. In addition, on September 5, 2018, the U.S. District Court in the District of Columbia granted the FTC a preliminary injunction blocking the Cristal Transaction.

Following the issuance of a preliminary injunction by the U.S. District Court, we commenced settlement discussions with the FTC. We proposed to divest all of Cristal s North American operations including the Ashtabula, Ohio two-plant TiO_2 production complex to a purchaser acceptable to the FTC. Initially, we intended to divest Cristal s North American operations to Venator. When we announced the divestiture of the 8120 Grade to Venator on July 16, 2018 we also announced that we had entered into a binding Memorandum of Understanding (MOU) with Venator providing for the negotiation in good faith of a definitive agreement to sell the entirety of Cristal s North American operations to Venator if a divestiture of all or a substantial part of Ashtabula was required to secure final FTC regulatory approval for the Cristal Transaction. The MOU granted Venator exclusivity for a period of 75 days to negotiate a definitive agreement for the sale of the entirety of the Ashtabula complex. The MOU also provided for a $75 million break fee if, among other things, the parties, despite negotiating in good-faith and in conformity with the terms in the MOU, failed to reach a definitive agreement for the sale of Cristal s North American operations and Tronox was able to consummate both the Cristal Transaction and the paper-laminate grade divestiture to Venator. On October 1, 2018, we announced that the 75-day exclusivity period under the MOU with Venator had expired without the two companies agreeing to terms.

Subsequent to the expiration of the exclusivity period with Venator, we announced an agreement in principle with INEOS Enterprises A.G., a unit of INEOS and one of the world s largest chemicals companies (INEOS), to divest Cristal s North American operations for approximately $700 million. We, Cristal and INEOS have been engaged in on-going discussions with the FTC since that time regarding the terms and conditions under which the FTC would allow the Cristal Transaction to be consummated. Most recently, on February 11, 2019, in recognition of the progress made to date in settling the dispute with the FTC, we and the FTC staff filed a joint motion with the FTC Commissioners requesting a delay of the deadline for the FTC to respond to our appeal of the ALJ s initial December 10, 2018 decision finding that the proposed acquisition of Cristal may substantially lessen competition for the sale of chloride-based TiO_2 in North America

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 the Kingdom of Saudi Arabia (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. National Industrialization Company (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 TiO_2 pigment production and TiO_2 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

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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), 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; provided, that the Option and the Put may not be exercised if the Cristal Transaction is not consummated. During the year ended December 31, 2018, we loaned $64 million for capital expenditures and operational expenses to facilitate the start-up of the Slagger. An additional $25 million was loaned on January 4, 2019.

Re-Domiciliation from Australia to the United Kingdom

In November 2018, we announced our intention to re-domicile from Western Australia to the United Kingdom (the Re-Domicile Transaction). The Re-Domicile Transaction will be effected via a scheme of arrangement overseen by an Australian Court. Pursuant to such scheme of arrangement, holders of our Class A Shares and Class B ordinary shares (Class B Shares) will be required to exchange their shares in Tronox Limited on a 1:1 basis for ordinary shares in Tronox Holdings plc, a newly formed entity incorporated under the laws of England and Wales (New Tronox), which shares are proposed to be listed on the New York Stock Exchange (the NYSE). On February 8, 2019, the first Australian Court hearing occurred whereby the Court approved the Class A and Class B shareholder meetings to be convened for the purpose of approving the Re-Domicile Transaction, as well as approved the mailing by us of the definitive proxy statement in connection with such shareholder meetings. We have scheduled a general meeting of our Class A shareholders and a separate meeting of our Class B shareholder to approve the Re-Domicile Transaction on March 8, 2019. Assuming we receive the requisite shareholder approvals, the final Australian court approval and other customary conditions are satisfied, we expect such transaction to be fully implemented by the end of the first quarter 2019. We do not anticipate that the Re-Domicile Transaction will have a material impact on our shareholders from a financial, governance or tax perspective. Rather, we believe the Re-Domicile Transaction is the next logical step in our stated strategic goal of becoming the world s most vertically integrated and lowest cost producer of TiO and will benefit our shareholders in a number of important ways, including:

- increasing the attractiveness of our shares to certain investors by eliminating the dual class share structure, and by providing our Board with greater authority and flexibility to undertake share repurchases than our current Constitution or Australian law permits;
- facilitating the ability of our Board to periodically refresh itself as we believe it will be easier to recruit new Board members to a UK incorporated company, we will have more flexibility in terms of board size and composition, and there will no longer be a requirement that two of our Board members are Australian residents;
- providing greater certainty with respect to certain tax matters in light of the Multilateral Instrument by the Governments of Australia and the UK; and
- bringing our jurisdiction of incorporation more into line with some of our peers and the majority of other non-US companies listed on the NYSE thereby potentially more easily attracting investors.

Exxaro Mineral Sands Transaction Completion Agreement

On November 26, 2018, we and certain of our subsidiaries (collectively, the Tronox Parties) and Exxaro Resources Limited (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 approximately 23% ownership interest in us during 2019, helps to facilitate the Re-Domicile Transaction, as well as addresses several legacy issues related to our 2012 acquisition of Exxaro s mineral sands business (the 2012 Exxaro transaction).

Orderly Sale of Exxaro s 23% Ownership in Tronox

In the 2012 Exxaro transaction, as part of the consideration for Exxaro s mineral sands business, we issued to Exxaro approximately 38.5% of our then outstanding voting securities in the form of Class B Shares. On March 8, 2017, Exxaro announced its intention to begin to sell its ownership stake in us over time. On October 10, 2017, in order to sell a portion of its ownership interest in us, Exxaro converted 22,425,000 of

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its Class B Shares into Class A Shares and sold those shares in an underwritten registered offering. The Completion Agreement sets forth the terms under which Exxaro may convert and then sell its remaining 28,729,280 Class B Shares during the course of 2019. The Completion Agreement contemplates that the sale of Exxaro s remaining ownership interest in Tronox will be undertaken in a manner that we believe will not cause us to lose, under limitations set forth in Section 382 of the U.S Internal Revenue Code of 1985, as amended (the Code), the benefit of approximately $4.1 billion of net operating losses and/or the approximately $1.1 billion of Section 163(j) of the Code interest expense carryforwards. For further information regarding the risk of us losing certain tax attributes, see the section included elsewhere in this Form 10-K entitled Risk Factors – Risks Relating to our Business – Our ability to use our tax attributes to offset future income may be limited.

Specific Provisions in the Exxaro Completion Agreement relating to the Re-Domicile Transaction

Pursuant to the terms of the Completion Agreement, Exxaro agreed to vote its Class B Shares in favor of the Re-domicile Transaction. In addition, the Completion Agreement contains several other provisions that are material with respect to the Re-Domicile Transaction, including:

- We have the right to repurchase from Exxaro any Class B Shares (or from the completion date of the Re-Domicile Transaction, any of its ordinary shares in New Tronox) that Exxaro desires to sell. The purchase price of any such repurchase will be based on market-related prices;
- One of the Tronox Parties 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 New Tronox 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 one of the Tronox Parties 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 (such as losses on a disposal of any of Exxaro's ordinary shares in the New Tronox subsequent to the completion date of the Re-Domicile Transaction); and
- Exxaro has also agreed that it will enter into a new shareholder agreement with us conditional upon completion of the Re-Domicile Transaction which, among other things, will enable us to eliminate the Class B Shares.

Legacy issues related to the 2012 Exxaro transaction addressed in the Completion Agreement

Pursuant to the 2012 Exxaro transaction, Exxaro retained a 26% ownership interest in our two South African subsidiaries related to the mineral sands business to enable us to satisfy certain Black Economic Empowerment regulations promulgated by the South African Department of Mineral Resources (the DMR). The 2012 Exxaro transaction agreements contemplated that by 2022, Exxaro would sell to us its remaining 26% interests in those two South African subsidiaries for 7.2 million additional Class B Shares. The Completion Agreement allows Exxaro and us to conclude matters from that transaction in a way that we believe is mutually beneficial to both parties by, among other things, providing us with the option to pay cash consideration for Exxaro s remaining 26% interests in the two South African subsidiaries in lieu of issuing additional Class B Shares. Additionally, the Completion Agreement amends such flip-in rights granted to Exxaro by accelerating the triggering of such right based upon the application of the once-empowered-always-empowered principle that has recently been confirmed by the South African High Court. See Risk Factors – Our South African mining rights are subject to onerous regulatory requirements imposed by legislation and the Department of Mineral Resources, the compliance of which could have a material adverse effect on our business, financial condition and results of operations.

Furthermore, pursuant to the Completion Agreement, the parties agreed to accelerate the date on which we will buy from Exxaro its 26% membership interest in Tronox Sands LLP, a U.K. limited liability partnership (Tronox Sands). Tronox Sands holds intercompany loans that Exxaro held prior to our 2012 acquisition of Exxaro s mineral sands

business. 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 represents Exxaro s indirect share of the loan accounts in our South African subsidiaries.

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Sale of our Electrolytic Business

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 TiO_2 segment, for $1.3 million in cash and a secured promissory note of $4.7 million which was paid in full on December 27, 2018. The total pre-tax loss on the sale of $31 million has been recorded in Impairment loss in the Consolidated Statements of Operations.

Our Principal Products

TiO_2 pigment: TiO_2 pigment is used in a wide range of products due to its ability to impart whiteness, brightness, and opacity. TiO_2 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. TiO_2 pigment is considered to be a quality of life product. At present, it is our belief that there is no effective substitute for TiO_2 pigment because no other white pigment has the physical properties for achieving comparable opacity and brightness, or can be incorporated as cost effectively. In 2018, we generated $1.265 billion in revenue from sales of TiO_2 pigment.

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 higher 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 2018, we generated $293 million in revenue from sales of zircon.

High Purity Pig Iron: During the process of smelting ilmenite at our smelters to produce TiO_2 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 brake calipers and steering knuckles in cars and trucks. In 2018, we generated $87 million in revenue from sales of pig iron.

Feedstock and Other Products: Most TiO_2 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 TiO_2 pigment. There is substantial overlap amongst each of the aforementioned with the primary differentiating factor being the level of titanium dioxide content. For instance, rutile has the highest titanium dioxide concentration of approximately 94% to 96%, while ilmenite has the lowest of approximately 45% to 65%. In 2018, we generated $137 million in revenue from the sale of feedstock and other products.

As mentioned previously, on September 1, 2018, we sold our Henderson Electrolytic Operations to EMD Acquisition LLC. Prior to the sale, we generated approximately $37 million in revenues from the operations in 2018.

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 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;

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- 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; and
- 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.

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, 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-slimed, 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 high purity rutile which can immediately be used as feedstock material to make TiO_2 pigment or sold to the titanium metal, welding and other industries.

Ilmenite is generally further refined for use in our chloride-based TiO_2 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 TiO_2 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 TiO_2 feedstock material.

Our mining and beneficiation operations have a combined annual production capacity of approximately 721,000 metric tons (MT) of titanium feedstock, which is comprised of 91,000 MT of rutile and leucoxene, 220,000 MT of synthetic rutile and 410,000 MT of titanium slag. We have the capability to produce approximately 220,000 MT of zircon and 221,000 MT of pig iron.

Competitive Conditions-Mining

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 TiO_2 chloride producers. We believe that our degree

of vertical integration is unique and that we are the only company that has significant mining, upgrading and TiO_2 pigment manufacturing capabilities.

Production of TiO_2 Pigment

TiO_2 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

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(collectively known as finishing). Currently, all of our TiO_2 pigment is produced using the chloride process. We believe that we are one of the largest global producers and marketers of TiO_2 pigment manufactured via chloride technology.

In the chloride process, high quality feedstock (slag, synthetic rutile, natural rutile or, in limited cases, high titanium content ilmenite ores) are reacted with chlorine (the chlorination step) and carbon to form titanium tetrachloride (TiCl4) in a continuous fluid bed reactor. Purification of TiCl4 to remove other chlorinated products is accomplished using selective condensation and distillation process. 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 TiO_2 production capacity in North America, and approximately 46% of industry-wide capacity globally.

Commercial production of TiO_2 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 TiO_2 is preferred over anatase TiO_2 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 TiO_2 can be produced using either the chloride process or the sulfate process.

The primary raw materials used in the production of TiO_2 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 TiO_2 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

We supply and market TiO_2 under the brand name TRONOX® to approximately 700 customers in approximately 100 countries, including market leaders in each of the key end-use markets for TiO_2, and we have supplied each of our top ten customers with TiO_2 for more than 10 years.

The following sets forth the percentage of our sales volume by end-use market for the year ended December 31, 2018.

In addition to price and product quality, we compete on the basis of technical support and customer service. Our direct sales 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 TiO_2 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 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.

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Competitive Conditions- TiO_2

The global market in which our TiO_2 pigment business operates is highly competitive. Competition is based on a number of factors such as price, product quality and service. We face competition not only from chloride process pigment producers, but from sulfate process pigment producers as well. 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, Cristal Global, Venator, Kronos Worldwide Inc. and Lomon Billions. 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, while the majority of scientists supporting our TiO_2 pigment business are located in Oklahoma City, Oklahoma, USA.

New process developments are focused on increased throughput, efficiency gains and general processing equipment-related improvements. Ongoing development of process technology contributes to cost reduction, enhanced production flexibility, increased capacity, and improved consistency of product quality. In 2018, our product development and commercialization efforts were focused on several TiO_2 pigment 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, 2018, we held 33 patents and 4 patent applications in the U.S., and approximately 209 in foreign counterparts, including both issued patents and pending patent applications. Our U.S. patents have expiration dates ranging through 2036. Additionally, we have 2 trademark registrations in the U.S., as well as 51 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, 2018, we had approximately 3,330 employees worldwide, of which 610 are located in the U.S., 600 in Australia, 1,840 in South Africa, and 280 in the Netherlands and other international locations. Our employees in the U.S. are not represented by a union or collective bargaining agreement. In South Africa, approximately 74% of our workforce belongs to a union. In Australia, most employees are not currently

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represented by a union, but approximately 46% are represented by a collective bargaining agreement. In the Netherlands, approximately 49% of our employees are represented by a collective bargaining agreement and 27% are members of a union. 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).

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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 with 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 TiO_2 pigment as carcinogenic in humans by inhalation. On October 12, 2017, ECHA s Committee for Risk Assessment (RAC) released a written opinion dated September 14, 2017 stating that based on the scientific evidence it reviewed, there is sufficient grounds to classify TiO_2 under the EU s Classification, Labelling and Packaging Regulation (CLP) as a Category 2 Carcinogen, but only with a hazard statement describing the risk by inhalation. After reviewing the RAC s formal recommendation on February 14, 2019, the EC was unable to reach a decision and will re-consider the proposal at its next meeting on March 7, 2019. For additional information on this topic, see the section entitled Risk Factors – Risks Relating to our Business – The classification of TiO_2 as a Category 2 Carcinogen in the European Union could result in more stringent regulatory control with respect to TiO_2.

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.

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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 THE CRISTAL TRANSACTION

Our pending acquisition of the Cristal TiO_2 business may not be consummated, the failure to complete the Cristal TiO_2 business acquisition could impact our stock price and financial results and the ongoing uncertainty as to whether the transaction will be consummated could all adversely affect our business.

On February 21, 2017, we entered into a transaction agreement to acquire the titanium dioxide business of The National Titanium Dioxide Co. Limited (Cristal) (the Cristal Transaction). On March 1, 2018, Tronox, Cristal and Cristal Inorganic Chemicals Netherlands Cooperatief W.A. ("Cristal Inorganic"), a wholly-owned subsidiary of Cristal, entered into an Amendment to the Transaction Agreement (the Amendment) that extended the termination date under the Transaction Agreement to March 31, 2019, if necessary based on the status of outstanding regulatory approvals. On February 27, 2019, we agreed with Cristal to extend the date on which our acquisition agreement expires from March 31, 2019 to May 19, 2019. Completion of the Cristal Transaction is subject to certain closing conditions, including certain regulatory approvals, as more fully described below.

On December 5, 2017, the U.S. Federal Trade Commission (FTC) announced that it would not approve the Cristal Transaction as proposed and filed an administrative action to prevent the parties from consummating the transaction alleging that the Cristal Transaction would violate Section 7 of the Clayton Antitrust Act and Section 5 of the FTC Act. The administrative complaint sought, among other things, a permanent injunction to prevent the transaction from being completed. On December 9, 2018, the administrative law judge issued an initial decision enjoining Tronox from consummating the proposed Cristal Transaction.

Additionally, on July 10, 2018, we received notice that the FTC had filed a complaint against us in the U.S. District Court in the District of Columbia (the U.S. District Court). The complaint alleged that Tronox s pending acquisition of the TiO_2 business of Cristal would violate antitrust laws by significantly reducing competition in the North American market for chloride-process TiO_2. On September 5, 2018, the U.S. District Court granted the FTC a preliminary injunction blocking the Cristal Transaction.

As a result of the outstanding U.S. regulatory approval, there can be no assurance that all closing conditions for the Cristal Transaction will be satisfied and, if they are satisfied, that they will be satisfied in time for the closing to occur by May 19, 2019, at which time either party to the transaction agreement may mutually agree to extend the closing date or terminate the transaction agreement. If the Cristal Transaction has not closed by May 19, 2019 and the parties have not mutually agreed to extend such date then pursuant to the Amendment, we may be obligated to pay Cristal a $60 million break-fee.

The Cristal Transaction is conditioned on the Company obtaining financing sufficient to fund the cash consideration, and the transaction agreement provides that the Company must pay to Cristal a termination fee of $100 million if all conditions to closing, other than the financing condition, have been satisfied and the transaction agreement is terminated because closing of the Cristal Transaction has not occurred by May 19, 2019, and the parties have not

mutually agreed to extend such closing date.

If the Cristal Transaction is not completed, our ongoing business and financial results may be adversely affected and we will be subject to a number of risks, including the following:

- depending on the reasons for the failure to complete the Cristal Transaction we could be liable to Cristal for a break fee or termination fee or other damages in connection with the termination or breach of the transaction agreement;

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- we have dedicated and we expect we will continue to commit significant time and resources, financial and otherwise, in planning for the acquisition and the associated integration; and
- while the transaction agreement is in effect prior to closing the Cristal Transaction, we are subject to certain restrictions on the conduct of our business, which may adversely affect our ability to execute certain of our business strategies.

In addition, if the Cristal Transaction is not completed or is completed subject to significant conditions or remedies, we may experience negative reactions from the financial markets and from our customers and employees. If the acquisition is not completed, these risks may materialize and may adversely affect our business, results of operations, cash flows, as well as the price of our ordinary shares.

Finally, uncertainty about the effect of the Cristal Transaction on employees, customers and suppliers may have an adverse effect on our business and financial results. These uncertainties may impair our ability to attract, retain and motivate key personnel until the Cristal Transaction is consummated and for a period of time thereafter, and could cause our customers, suppliers and other business partners to delay or defer certain business decisions or to seek to change existing business relationships with us. The occurrence of any of these events could have a material adverse effect on our operating results, particularly during the period immediately following the closing of the Cristal transaction.

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.

If the Cristal Transaction is consummated, Cristal Inorganic will own approximately 23.5% of the outstanding ordinary shares of the Company. Following the closing of the Cristal Transaction, Exxaro will own approximately 18% of the Company s outstanding ordinary shares, based upon its share ownership as of the date of this annual report.

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 its judgment, could enhance its 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, to be entered into upon the assumed closing of the Cristal Transaction (the Cristal Shareholders Agreement), among the Company, on the one hand, and Cristal, Cristal Inorganic and the three shareholders of Cristal, on the other hand (collectively, the Cristal Shareholders), as long as the Cristal Shareholders, collectively, beneficially own at least 24,900,000 or more of Class A Shares, they will have the right to designate for nomination two Class A Directors of the Board (defined below) and, as long as they beneficially own at least 12,450,000 Class A Shares but less than 24,900,000 Class A Shares, they will have the right to designate for nomination one Class A director of the Board. The Cristal Shareholders Agreement also will provide that as long as the Cristal Shareholders own at least 12,450,000 Class A Shares, they will be granted certain preemptive rights. Also under the Cristal Shareholders Agreement, the Company has agreed to file promptly after the closing of the acquisition a registration statement covering approximately four percent of the then-outstanding ordinary shares of the Company, which may be sold as soon as such registration statement is effective. Other than with respect to those shares, the Cristal Shareholders Agreement will include restrictions on Cristal Inorganic s ability to transfer any of its Class A Shares for a period of three years after the closing of the acquisition other than to certain permitted transferees after the later of eighteen months and the resolution of all indemnification claims under the transaction agreement. The Cristal Shareholders Agreement will also contain certain demand and piggyback registration rights, which commence after the three-year transfer restriction period expires. In addition, if the Cristal Transaction closes subsequent to the Re-Domicile Transaction, then New Tronox shall enter into a shareholders agreement with Cristal,

Cristal Inorganic and the three shareholders of Cristal on similar terms and conditions as the Cristal Shareholders Agreement.

As a result of these or other factors, including as a result of such offering of shares by Cristal 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.

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If the Cristal Transaction is consummated, we may not be able to realize anticipated benefits of the Cristal Transaction, including expected synergies, earnings per share accretion or earnings before interest, taxes, depreciation and amortization (EBITDA) and free cash flow growth.

The success of the pending 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 business and operations. Even if we are able to integrate the acquired businesses and operations successfully, this integration may not result in the realization of the full benefits of the pending Cristal Transaction that we currently expect within the anticipated time frame or at all. In addition, any remedial transaction entered into for the purpose of obtaining approval by the FTC may negatively impact our ability to realize any expected synergies, as well as could result in lower than anticipated cost synergies, earnings per share accretion or EBITDA and/or free cash flow growth.

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.

If the Cristal Transaction is consummated, the combined company s future results could suffer if it does not effectively manage its expanded business, operations and employee base.

The size of the combined company s business, operations and employee base following the Cristal Transaction will be greater than the current standalone size of our business, operations and employee base. The combined company s 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 if the Cristal Transaction is consummated.

When we announced the divestiture of the 8120 Grade to Venator Materials PLC (Venator) on July 16, 2018 we also announced that we had entered into a binding Memorandum of Understanding (MOU) with Venator providing for the negotiation in good faith of a definitive agreement to sell the entirety of Cristal s North American operations to Venator if a divestiture of all or a substantial part of Ashtabula was required to secure final FTC regulatory approval for the Cristal Transaction. The MOU granted Venator exclusivity for a period of 75 days to negotiate a definitive agreement for the sale of the entirety of the Ashtabula complex. The MOU also provided for a $75 million break fee (the Break Fee) if, among other things, the parties, despite negotiating in good-faith and in conformity with the terms in the MOU, failed to reach a definitive agreement for the sale of Cristal s North American operations and Tronox was able to consummate both the Cristal Transaction and the paper-laminate grade divestiture to Venator. On October 1, 2018, we announced that the 75-day exclusivity period under the MOU with Venator had expired without the two companies agreeing to terms. There can be no assurance that if the Cristal Transaction is consummated we will not be required to pay Venator the Break Fee.

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If the Cristal Transaction is consummated, the combined company will be exposed to the risks of operating a global business in new countries.

Cristal s TiO_2 business operates in certain countries, such as Brazil, China and the Kingdom of Saudi Arabia, in which we have not historically had operations or business. The combined company s global operations will be subject 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 the combined company’s ability to capitalize on opportunities;
- cybersecurity attacks, including industrial espionage or ransomware attacks;
- 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.

Cristal is currently not a publicly reporting company and the obligations associated with integrating into a public company will require significant resources and management attention.

Cristal is, and prior to the proposed consummation of the Cristal Transaction remains, a private company that is not subject to U.S. financial reporting requirements. If the Cristal Transaction is consummated, the Cristal business will 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. However, the measures we take may not be sufficient to satisfy our obligations as a public company. If we do not continue to develop and implement the right processes and tools to manage our changing enterprise upon the Cristal Transaction and maintain our culture, our ability to compete successfully and achieve our business objectives could be impaired, which could negatively impact our business, financial condition and results of operations. In addition, we cannot predict or estimate the amount of additional costs we may incur to bring Cristal into compliance with these requirements. In addition, bringing Cristal into compliance with these rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. These additional obligations could

have a material adverse effect on our business, financial condition, results of operations and cash flow.

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Cristal may have liabilities that are not known to us and the indemnities we have negotiated in the Cristal Transaction Agreement may not adequately protect us.

If the Cristal Transaction is consummated, we will assume certain liabilities of Cristal, including significant environmental remediation and monitoring liabilities at Cristal s current and formerly-owned properties and closure and post-closure costs at certain of Cristal s mining and landfill facilities. There may be liabilities that we failed or were unable to discover in the course of performing due diligence investigations into Cristal. Any such liabilities, individually or in the aggregate, could have a material adverse effect on our business, financial condition and results of operations. As we integrate Cristal, we may learn additional information about Cristal that may adversely impact us, such as unknown or contingent liabilities, adequacy of financial reserves and issues relating to non-compliance with applicable laws.

RISKS RELATING TO THE RE-DOMICILE TRANSACTION

Assuming consummation of the Re-Domicile Transaction, English law and provisions in the new articles of association of New Tronox 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.

Assuming consummation of the Re-Domicile Transaction, certain provisions of the U.K. Companies Act 2006 (the "Companies Act") and the articles of association of New Tronox may have the effect of delaying or preventing a change in control of us or changes in our management. For example, New Tronox s articles of association will 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.

Assuming consummation of the Re-Domicile Transaction, although we do not anticipate New Tronox 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.

Assuming consummation of the Re-Domicile Transaction, 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 are expected to reside outside the United Kingdom, we do not anticipate that New Tronox will be subject to the Takeover Code. However, if at the time of a takeover offer subsequent to the Re-Domicile Transaction 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

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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.

Assuming consummation of the Re-Domicile Transaction, as a public limited company incorporated in England and Wales, certain capital structure decisions will require approval of New Tronox s 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 have obtained previous shareholder authority for New Tronox 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 have obtained previous shareholder authority for New Tronox 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 have obtained previous shareholder authority for New Tronox 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).

Assuming consummation of the Re-Domicile Transaction, economic conditions and regulatory changes following the U.K. s likely exit from the E.U. could adversely impact our operations, operating results and financial condition.

The U.K. held a referendum in June 2016 to determine whether the U.K. should leave the E.U. or remain as a member state, the outcome of which was in favor of leaving the E.U. The U.K. government initiated the formal process to leave the E.U. (often referred to as Brexit) on March 29, 2017, which will result in the U.K. leaving the E.U. on March 29, 2019 unless the U.K. revokes the notification of its intention to leave or the remaining E.U. member states and the U.K. unanimously decide to extend this period. The referendum triggered financial volatility, including a decline in the value of the British pound sterling in comparison to both the U.S. dollar and euro. It is expected that Brexit will continue to 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 either during a transitional period or more permanently. Given the lack of comparable precedent, assuming consummation of the Re-Domicile Transaction, 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 on which the U.K. will leave the E.U., 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.

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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. All of these potential consequences could be further magnified if additional countries were to seek to exit the E.U.

Assuming consummation of the Re-Domicile Transaction, exposure to U.K. political developments could affect us.

Assuming consummation of the Re-Domicile Transaction, political change in the U.K. has the potential to directly affect New Tronox through the introduction of new laws (including tax laws) or regulations. The current government in the U.K. is a minority government and any future change in government in the U.K. could affect us due to changes in government policy, legislation or regulatory interpretation.

Subsequent to the Re-Domicile Transaction, transfers of shares in New Tronox 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.

Assuming consummation of the Re-Domicile Transaction, except for any new ordinary shares which are to be received by a holder deemed to be an affiliate of New Tronox for purposes of U.S. securities laws, it is anticipated that the ordinary shares of New Tronox will be 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 the books of New Tronox. 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.

In connection with the consummation of the Re-Domicile Transaction, we expect to put in place arrangements to require that New Tronox s 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 depositary specified by us so that SDRT may be collected in connection with the initial delivery to the depositary. Any such ordinary shares will be evidenced by a receipt issued by the depositary. Before the transfer can be registered in our books, the transferor will also be required to put the depositary 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.

Assuming consummation of the Re-Domicile Transaction, New Tronox s articles of association will provide that the courts of England and Wales will have exclusive jurisdiction to determine any dispute brought by a shareholder in that shareholder s capacity as such and certain other matters.

Assuming consummation of the Re-Domicile Transaction, New Tronox s articles of association will provide that the courts of England and Wales will 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 New Tronox or seeking relief on behalf of New Tronox, against New Tronox 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 new 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 New Tronox or its directors, former directors, officers, employees or shareholders which may discourage lawsuits against New Tronox and its directors, former directors, officers, employees or shareholders.

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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, negatively impacting our financial results.

Our revenue and results of operations are significantly dependent on direct sales of our TiO_2 products, zircon, pig iron and feedstock/other products to customers. Demand for our products historically has 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 products comes from manufacturers of paint and plastics, and other industrial customers, as well as from customers in the ceramics industry. Companies that operate in the industries that these industries serve, including automotive and construction, 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, many large end users of our products depend upon the availability of credit on favorable terms to make purchases of raw materials such as TiO_2. As interest rates increase or if our customers creditworthiness deteriorates, this credit may be expensive or difficult to obtain. If these customers cannot obtain credit on favorable terms, they may be forced to reduce their purchases. These and other factors may lead some customers to seek renegotiation or cancellation of their arrangements with our businesses, which could have a material adverse effect on our results of operations.

The price of our products, in particular, TiO_2 pigment, zircon, pig iron 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 TiO_2 pigment, zircon, pig iron and feedstock/other products have been volatile, and those markets are likely to remain volatile in the future. Prices for TiO_2 pigment, zircon, pig iron and feedstock/other products 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, including in the paint and plastics 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 TiO_2, feedstock and related co-products, 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 TiO_2, feedstock and related co-products.

Pricing pressure with respect to our TiO_2 pigment products, zircon, pig iron and feedstock/other products 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 TiO_2 industry is based on a number of factors such as price, product quality, and service. We face significant competition from major international and smaller

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regional competitors. We also compete with Chinese producers that have significantly expanded their production capacity in recent years and have also commenced the commercial production of TiO_2 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 certain events, such as new product development by competitors, changing customer needs, increased commercial production of TiO_2 via chloride technology, greater acceptance of TiO_2 via sulfate technology in end-market applications hereto for characterized by TiO_2 via chloride technology, production advances for competing products, or price changes in raw materials, could cause our customers to switch to our competitors products. Our inability to develop and produce or market our products to compete effectively against our competitors following such events 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 2018, ore, process chemicals and energy used in the production of TiO_2 constituted approximately 41%, 17% and 11%, 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 TiO_2 manufacturing and mining operations form an important part of our TiO_2 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. Because TiO_2 is widely used in paint and other coatings, titanium feedstocks are in higher demand prior to the painting season in the Northern Hemisphere (spring and summer), and pig iron is in lower demand during the European summer holidays, when many steel plants and foundries undergo maintenance. 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 TiO_2.

Exxaro continues to hold a large portion of our total outstanding voting securities, as well as retains distinct governance and other rights as a result of our 2012 acquisition of Exxaro s mineral sands businesses.

At December 31, 2018, Exxaro held approximately 23% of our voting securities, and had two representatives serving as Directors on our nine-member board. On March 8, 2017, Exxaro announced its intention to begin pursuing a path to sell its ownership stake in us over time. In part to facilitate the sale by Exxaro of its Tronox shares in an orderly,

predictable manner, we entered into the Completion Agreement with Exxaro which sets forth the terms under which Exxaro may further monetize its remaining stake during the course of 2019, with any such monetization being subject to market conditions. Future sales by Exxaro of our shares will result in additional Class B Shares converting to Class A Shares and an increase in the number of Class A Shares outstanding which could cause the market price of our shares to decline.

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Due to Exxaro s current ownership interest, it is entitled to certain governance rights under our Constitution and Shareholder s Deed. For example, the Constitution provides that, for as long as the Class B voting interest is at least 10% of our total voting interest, there must be nine directors on our board; of which the holders of Class A Shares will be entitled to vote separately to elect a certain number of directors to our board (which we refer to as Class A Directors), and the holders of Class B Shares will be entitled to vote separately to elect a certain number of directors to our board (which we refer to as Class B Directors). If the Class B voting interest is greater than or equal to 20% but less than 30%, our board of directors will consist of seven Class A Directors and two Class B Directors. If the Class B voting interest is greater than or equal to 10% but less than 20%, our board will consist of eight Class A Directors and one Class B Director.

The Constitution also provides that, subject to certain limitations, for as long as the Class B voting interest is at least 20%, a separate vote by holders of Class A Shares and Class B Shares is required to approve certain types of merger or similar transactions that will result in a change in control or a sale of all or substantially all of our assets or any reorganization or transaction that does not treat Class A and Class B Shares equally.

As a result of Exxaro s current ownership interest and its governance rights, Exxaro may be able to exert substantial influence over our management, operations and potential significant corporate transactions, including a change in control or the sale of all or substantially all of our assets. Exxaro s influence may have an adverse effect on the trading price of our ordinary shares.

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 generally 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 ourselves, will be 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 result in material adverse effects on our business, financial condition or results of operations.

Prior to December 2017, Exxaro, by virtue of the fact that it was greater than 50% owned by historically disadvantaged South Africans and that it held a 26% ownership interest in our two South African operating entities, had historically been our BEE empowered entity allowing us to comply with the requirements of the MPRDA and Mining Charter II, the predecessor sector charter to Mining Charter III, for purposes of our existing mining rights. We believe that under Mining Charter III for the duration of our current mining rights the fact that we no longer have a BEE empowered entity holding 26% ownership interest in our two South African operating entities will not impact those rights negatively and that the once empowered always empowered principle applies to our existing mining rights. However, Mining Charter III will require that 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.

The once empowered always empowered principle asserts 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. 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. The South African High Court decided in the affirmative for the Minerals Council. 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

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existing mining rights or applications for new mining rights made under the Mining Charter III. In the event that the DMR were to challenge our compliance with Mining Charter III or the once empowered always empowered principle is otherwise not fully recognized, such decision could adversely affect our business, financial condition or results of operation.

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 Exxaro transaction, 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 Class B Shares. The Completion Agreement amends the flip-in rights granted to Exxaro so that Tronox may, subject to certain conditions, accelerate the occurrence of the flip in. If Tronox elects 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 be empowered (i.e. maintain 26% ownership by a BEE empowered entity). 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.

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 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. The South African government has announced a critical shortage of coal required for energy generation and, as such, 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. In addition, our KZN Sands operations currently use approximately 356,000 gigajoules of Sasol gas, which is available only from Sasol Limited. As such, restrictions or additional conditions imposed by Eskom such as load shedding, electricity restrictions and/or electricity price increases, as well as an interruption in the supply of Sasol gas could have a material adverse effect on our business, financial conditions or results of operations; however, a project is underway to replace approximately 30% to 44% of our current Sasol gas usage with furnace off-gas produced by KZN Sands.

Moreover, we use significant amounts of water in our South African operations which could result in significant costs. 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. However, changes to water-use licenses could affect our operational results and financial condition. Additionally, 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. 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.

Our operations in South Africa are also reliant on services provided by the State owned, and sole provider of rail transport, Transnet, for limited rail transport services at Namakwa Sands. 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.

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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 2018, 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 effects 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. Working 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.

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. Additionally, assuming the consummation of the Re-Domicile Transaction, our board of directors will have the ability to establish a shareholder rights plan to prevent an ownership change for the purpose of Section 382 of the Code. Although we believe the Completion Agreement and Re-Domicile Transaction should provide sufficient protection of the approximately $4.1 billion of NOLs and/or the approximately $1.1 billion of 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

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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, 2018, our total principal amount of debt was approximately $3.2 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.

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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 facilities, 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 call or put option, there can be no assurance that we may assume this indebtedness and may need to obtain funding to repay it. Additional 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 and Euros, 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. We have made a U.S. dollar functional currency election for both Australian financial reporting and federal income tax purposes. On this basis, our Australian entities report their results of operations on a U.S. dollar basis. 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 2018. The 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.

In South Africa, over 74% of our workforce belongs to a union. In Australia, most employees are not currently represented by a union, but approximately 46% are represented by a collective bargaining agreement. In the Netherlands, approximately 49% of our employees are represented by a collective bargaining agreement and 27% are members of a union.

Our South African operations have entered into various agreements regulating wages and working conditions at our mines. There have been periods when various stakeholders have been unable to agree on dispute resolution processes, leading to threats of disruptive labor disputes, although only two strikes have ever occurred in the history of these operations. 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.

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

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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.

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 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 facility, 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. 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,

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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 are currently addressing certain areas of known contamination on our own properties, none of which we presently anticipate will result in any material costs or adverse impacts on our business or operations. However, 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 applicable U.S., South African or Australian law, 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, exchange control restrictions, environmental remediation, mineral rights, ownership of mining

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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 TiO_2 as a Category 2 Carcinogen in the European Union could result in more stringent regulatory control with respect to TiO_2.

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 TiO_2 as carcinogenic in humans by inhalation. On October 12, 2017, ECHA s Committee for Risk Assessment (RAC) released a written opinion dated September 14, 2017 stating that based on the scientific evidence it reviewed, there is sufficient grounds to classify TiO_2 under the EU s Classification, Labelling and Packaging Regulation (CLP) as a Category 2 Carcinogen, but only with a hazard statement describing the risk by inhalation. After reviewing the RAC s formal recommendation on February 14, 2019, the European Commission was unable to reach a decision and will re-consider the proposal at its next meeting on March 7, 2019. If the European Commission ultimately decides to adopt this classification, it could require that products manufactured with TiO_2 be classified as containing carcinogenic materials, which could impact our business by inhibiting the marketing of products containing TiO_2 to consumers, and subject our manufacturing operations to new regulations that could increase costs. Any classification, use restriction or authorized requirement for use imposed by the ECHA 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.

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 is particularly severe in Western Australia and at Namakwa Sands, which 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

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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 TiO_2 or zircon content in consumer products which in turn could depress the demand and pricing for TiO_2 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.

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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 (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 TiO_2 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, 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

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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.

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

We are registered under the laws of Western Australia, Australia, and substantial portions of our assets are located outside of the U.S. In addition, certain members of our board of directors reside outside the U.S. As a result, it may be difficult for investors to effect service of process within the U.S. upon Tronox Limited or such other persons residing outside the U.S., or to enforce judgments outside the U.S. obtained against such persons in U.S. courts in any action, including actions predicated upon the civil liability provisions of the U.S. federal securities laws. In addition, it may be difficult for investors to enforce rights predicated upon the U.S. federal securities laws in original actions brought in courts in jurisdictions located outside the United States. This will continue to be the case in the event of the consummation of the Re-Domicile Transaction.

In addition, assuming consummation of the Re-Domicile Transaction, we will be incorporated under the laws of England and Wales. 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.

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Item 2. Properties

Below are our primary offices and facilities at December 31, 2018. 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
Kwinana Beach, Western Australia	Owned	Lot 22 Mason Road
London, United Kingdom	Leased	25 Bury Street, 3rd Floor
New York, New York	Leased	410 Park Avenue
Oklahoma City, Oklahoma	Leased	3301 NW 150 Street

TiO_2 Pigment Operations

Our TiO_2 pigment facilities consist of the physical assets necessary and appropriate to produce, distribute and supply our TiO_2, pigment and consist mainly of manufacturing and distribution facilities. The following table summarizes our TiO_2 production facilities and production facilities and capacity (in gross MT per year), by location:

Facility	Production	TiO_2 Capacity	Process	Property Owned/Leased	Facility Owned/Leased
Hamilton, Mississippi	TiO_2	225,000	Chloride	Owned	Owned
Kwinana, Western Australia	TiO_2	150,000	Chloride	Owned	Owned
Botlek, the Netherlands	TiO_2	90,000	Chloride	Leased	Owned

For a property description relating to our mining operations, see Item 1 Business – Mining and Beneficiation of Mineral Sands Deposits.

TiO_2 Mining Operations

We own and operate three integrated mining-mineral processing operations: two mine-heavy mineral separation-smelter operations on the east and west coasts of South Africa; and a mine-heavy mineral separation-synthetic rutile operation that is further integrated with a TiO_2 pigment manufacturing plant on the west coast of Australia.

Our KZN Sands operations consist of the Fairbreeze mine, a concentration plant, a mineral separation plant and a smelter complex with two furnaces.

Our Namakwa Sands operations include two mines each feeding primary concentrators, one secondary concentration plant, mineral separation (dry) plant, and a smelter complex, with two furnaces.

Our Western Australia operations consist of the Cooljarloo dredge mine and floating heavy mineral concentration plant and the Chandala metallurgical complex, which includes a mineral separation plant and a synthetic rutile plant.

Mineral Properties

As of December 31, 2018, we owned mining rights to ore reserves described herein at our three mineral sands operations in South Africa and Western Australia, where we mine heavy mineral sands to supply titanium mineral feedstock to our TiO_2 manufacturing business and co-products for external sale.

Reporting of Ore Reserve and Mineral Resources

U.S. registrants are required to report ore reserves under Industry Guide 7, Description of Property by Issuers Engaged or To Be Engaged in Significant Mining Operations . Industry Guide 7 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.

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Our mineral reserve estimates are based on techno-economic models developed by teams of Tronox professionals with complementary skills and a deep knowledge of their respective operations, utilizing Life-of-Mine Plans (LOMP) that are maintained at each mining operation. 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. The LOMP serves as a strategic business plan for short and long-term mine planning and decision-making. Our mineral reserve estimates are routinely analyzed internally and externally to ensure compliance with SEC Industry Guide 7.

Reserve estimates for our South Africa operations are guided by the SAMREC code. Reserve estimates for our Western Australia operation are guided by the JORC code. SAMREC and JORC are both recognized by the Committee for Mineral Reserves International Reporting Standards (CRIRSCO), a family of guidelines for disclosures of mineral resources and reserves designed to ensure transparency, data validity and standardized methodologies for estimating the size and grades of mineral deposits.

Classifications and definitions of *Proven* and *Probable Reserves* under Industry Guide 7 are equivalent in all material respects to corresponding *Proved* and *Probable Reserves* under SAMREC and JORC. *Proven Reserves* have a higher level of confidence than *Probable Reserves*. Both are tabulated in this document, unmodified from reserve estimates prepared annually by experienced Tronox resource professionals who satisfy Competent Person requirements under SAMREC and JORC at each of our three heavy mineral sand operating units.

On October 31, 2018, the SEC announced its decision to modernize the property disclosure requirements for U.S. registrants with material mining operations. The new rules will replace current mineral property disclosure requirements under Industry Guide 7 and will be more closely aligned with the CRIRSCO-family of international standards, including SAMREC and JORC. Compliance with the new mineral disclosure rules is required for the first fiscal year beginning on or after January 1, 2021.

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 DMR and the Western Australia Department of Mines, Industry Regulation and Safety (“DMIRS”), respectively. All of our exploration and mining operations are subject to multiple levels of environmental regulatory review, that include approvals of environmental programs and public comment periods as pre-conditions to granting of mineral tenure.

Mineral Tenure - South Africa

The DMR is the regulatory administrator of mineral rights in South Africa, subject to the provisions of the MPRDA of 2004, amended 2009. 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 are initially granted for a maximum period of five years and can be renewed once for an extension of up to three years. Mining rights are granted by the DMR, subject to approvals by the Department of Environmental Affairs (DEA) of an Environmental Management Program (EMP) and an Integrated Water and Land Use License.

Mining rights are valid for up to 30 years and may be extended by 30-year renewals. They may be revoked if the conditions of the EMP are breached or for other contraventions of the MPRDA. Environmental permitting and compliance are co-administered by the DEA and Development Planning (Namakwa Sands) and the KZN DEA (KZN Sands). All rights, licenses and permits for Namakwa Sands and KZN Sands are in good standing.

Namakwa Sands holds mining and prospecting rights at the active mining site near Brand-se-Baai, through Tronox Mineral Sands (Pty) Ltd. Tronox also controls mining and prospecting rights in KwaZulu-Natal Province, on South Africa s Indian Ocean coast, through KZN Sands. Much of the surface access rights at the Fairbreeze mine are secured through an agreement with Mondi Ltd.

Mineral Tenure - Australia

Mining tenements in Western Australia include Exploration Licenses, Retention Licenses, Mining Leases, and other instruments set forth by the Western Australia Mining Act of 1978. Mining activities are governed by

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various laws and regulations administered by State and National agencies, particularly the DMIRS and the Western Australia Department of Water and Environmental Regulation.

In Western Australia, Tronox controls mining leases, exploration and other licenses and rights. 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 2019.

Mining of the main Cooljarloo deposits are authorized by the Mineral Sands (Cooljarloo) Mining and Processing Agreement Act 1988 (WA), under Mineral Sands Agreement 268 (MSA 268), covering 9,745 hectares (24,080 acres). The remainder of our heavy mineral ore reserves are held by mining leases granted by the DMIRS. We hold 15 mining and attendant environmental approvals at the Dongara project. Three older mining leases are held at our Jurien property, the site of a former heavy mineral open pit mine operated by another party in the 1970 s.

Mineral Sands - South Africa and Western Australia

Heavy Mineral (HM) sands are naturally concentrated granular minerals of high densities (conventionally above about 2.9 gm/cm3), formed by erosion, transport and concentration. Not all of the HM has commercial value, and a distinction is made between the Total Heavy Minerals (THM) and the portion of the THM composed of Valuable Heavy Minerals (VHM). VHM can be recovered at relatively low cost by gravity, magnetic and electrostatic separation techniques. In our disclosures, we express grade in terms of percentage of THM by weight in the ore, and express individual VHM as percentages of the total heavy minerals unless otherwise stated.

All of our HM mining operations extract ilmenite, a titanium-iron oxide mineral, rutile, a premium TiO_2 mineral feedstock and zircon, a zirconium silicate (ZrSiO4) mineral valuable for its application in a diverse range of industrial and construction end-uses. Leucoxene is a naturally upgraded form of ilmenite. Other heavy minerals present in our heavy mineral assemblages may have commercial value, subject to their recovery from heavy mineral concentrate (HMC) feed to our mineral separation plants. We recover and market staurolite, an aluminum silicate mineral used in sandblasting and other applications, at our Chandala mineral separation plant from the HMC feed from our Cooljarloo mine. Other mineral constituents of potential value include garnet and monazite. Our reserve estimates are based solely upon the value of extractable and recoverable zircon, rutile, ilmenite and leucoxene.

In 2018, we mined VHM, including ilmenite, rutile, leucoxene, and zircon at three integrated operations: Namakwa Sands, Western Cape, South Africa, KZN Sands; KwaZulu-Natal, South Africa; and Tronox Northern Operations in, Western Australia. Our three TiO_2 feedstock operating centers integrate ilmenite with metallurgical beneficiation. Ilmenite is converted to synthetic rutile (SR) in our Northern Operations in Western Australia, to provide SR feedstock to our Kwinana TiO_2 pigment manufacturing. Ilmenite is converted to titanium slag and pig iron in our integrated Namakwa and KZN smelter facilities in South Africa.

TRONOX MINERAL SAND PRODUCT CAPACITIES

Capacity (metric tons per year)	Namakwa Sands	KZN Sands	Western Australia	Total
Rutile[1]	31,000	25,000	35,000	91,000
Synthetic rutile	—	—	220,000	220,000
Titanium slag	190,000	220,000	—	410,000
Zircon[2]	125,000	55,000	40,000	220,000
Pig iron	100,000	121,000	—	221,000

Reserve life	25+ Years	17 Years	19 Years
Exploration rights & undeveloped reserves	Yes	Yes	Yes

(1) Rutile includes natural rutile and leucoxene.

(2) Includes all commercial grades of zircon

Namakwa Sands, Western Cape and KZN Sands, KwaZulu-Natal, South Africa

Our HM 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 and KZN Sands produce smelter products of titanium slag and pig iron, plus commercial grades of zircon and high-grade titanium mineral concentrates.

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In the Western Cape Province, we mine the large Namakwa HM deposit at Brand-se-Baai from two open-cut dry mines, using a combination of excavators, haul trucks and conveyors to deliver ore to two primary wet concentration plants. Primary heavy mineral concentrate is separated into magnetic and non-magnetic fractions at a secondary concentration plant at the mine. The two HMC fractions are further processed at a mineral separation plant (dry mill) 52 km south at Koekenaap. Ilmenite, rutile and zircon are transported by rail 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 reserve estimates as of December 31, 2018, in accordance with SAMREC and Industry Guide 7 reporting standards are: 40.8 million tonnes in-place HM, containing about 18.3 million metric tonnes ilmenite, 4.2 million tonnes zircon, and 3.8 million tonnes rutile and leucoxene from 657 million tonnes of ore. These reserves are sufficient to sustain the current rate of mining for at least 25 years without any new reserve additions.

The Namakwa 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. Multiple cycles of erosion from crystalline source rock, fluvial transport and prolonged reworking by water and wind formed the deposit.

The Namakwa 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 superposed 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). No overburden is present.

Adjustments to our geotechnical-economic modelling and a comprehensive metallurgical program have enabled division of the West and East deposits into blocks of discrete geological domains with distinctive mineralogical and processing characteristics. Our improved understanding of Namakwa ore has led to improvements in liberation and recoveries of VHM.

The KZN Sands integrated mining-processing operation consists of the Fairbreeze mine, south of the coastal town of Mtunzini, 45 kilometers SSW of Richards Bay, a Central Processing Complex (CPC) at Empangeni, where ilmenite is fed to a dual electric arc furnace smelter for conversion into slag and pig iron, and storage and export facilities at the port of Richards Bay. Smelter products, rutile and zircon are exported from Richards Bay. The Fairbreeze deposit is hosted by deeply weathered Berea-type sands which are mined using a hydraulic mining technique that was pioneered at the now-depleted Hillendale mine from 2001-2013. High-pressure water jets disaggregate the fine-grained ore sand into a slurry that is pumped to a semi-mobile primary wet plant for the production of heavy mineral concentrate. HMC is hauled by truck 40 km to the Empangeni CPC, 18 km west of Richards Bay, for separation into rutile, zircon and ilmenite. Ilmenite is fed to an adjoining two-furnace smelter for production of titanium slag and pig iron. All products are exported from Richards Bay.

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.

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Reserve estimates for KZN Sands as of December 31, 2018, in accordance with SAMREC and Industry Guide 7 reporting standards, are: 242 million tonnes ore averaging 5.8% total heavy minerals. Development drilling and re-classified Reserves net of mine depletion during 2018 added about 65 million tonnes ore to the Fairbreeze Reserve base.

Tronox Western Australia

Our Cooljarloo mine and Chandala metallurgical complex are the key components of our Northern Operations in Western Australia. Since the commencement of mining in December 1989, cumulative production during 29 years of continuous mining is approximately 17.5 million tonnes HMC from the Cooljarloo mine, approximately 170 km north of Perth. 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 synthetic rutile (SR), a high-TiO_2 feedstock for our integrated TiO_2 pigment plant at Kwinana, south of Perth. The Kwinana pigment plant and other components of our Southern Operations in Western Australia are described in Part 1, Item 1. See “Business – Mining and Beneficiation of Mineral Sands Deposits.”

Our Western Australia ore reserves total 11.2 million tonnes of in-place total heavy minerals, including 5.4 million tonnes from Cooljarloo, 2.6 million tonnes from Cooljarloo West, and 3.2 million tonnes from Dongara. The cumulative totals are sufficient to sustain our current value chain of HMC, multiple commercial grades of rutile, leucoxene and zircon, and SR feed to the Kwinana pigment plant for at least 19 years, without further additions of heavy mineral reserves.

Ore reserves from three-ore bodies at Cooljarloo West will be dredge-mined as an extension to the life of our Cooljarloo mining operations. Since our 2006 acquisition of the Dongara project, 370 kilometers north of Perth, we have completed several feasibility studies and obtained all long lead-time approvals for mining of the Dongara deposits, including environmental licenses and permits.

The disadvantage of mining low-grade ore at Cooljarloo is offset 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. Over our nearly three decades of operations, our professional staff in Western Australia has exploited opportunities to extract value from the integrated mine-to-pigment chain, allowing us to create one of the most efficient operations in the global mineral sands industry.

HM at Cooljarloo and Cooljarloo West occur in multiple, NNW-trending strands and elongate tabular bodies parallel to the modern coastline. A swarm of HM bodies in the Cooljarloo district span an area 40 km NNW by a width of over 5 km, bounded on the east by the Gingin scarp. Shoreline and shallow off-shore HM placers accumulated on the Swan Coastal Plain during static sea levels of the Pleistocene, or Ice Age . Heavy minerals were derived from the granitic and gneissic basement of the Yilgarn craton east of the scarp and recycled from underlying Mesozoic sediments of the northern Perth Basin. Most of the economically extractible HM deposits in the Cooljarloo district are overlain by younger overburden. Shoreline HM placers of slightly younger ages than Cooljarloo are also overlain by variable overburden at Jurien and Dongara.

Our total HM reserves at December 31, 2018 in Western Australia, including Cooljarloo, Cooljarloo West and Dongara are 482 million tonnes of ore containing 11.2 million tonnes of in-place heavy minerals, representing a 0.5% increase in THM from our year-end 2017 estimate. Mining depletion of 24 million tonnes ore at Cooljarloo was offset by reserve additions from re-modelling of the LOMP for Cooljarloo-Cooljarloo West, and new drilling at Cooljarloo West. Included in the in-ground heavy mineral reserves are approximately 6.4 million tonnes of ilmenite, 1.2 million tonnes of zircon, and over 900 thousand combined tonnes of rutile and leucoxene.

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Our 2018 combined production from the three HM mining-processing centers are shown in the table below.

Tronox 2018 Production of TiO_2, Feedstock and Co-Products

Tronox Operation	Rutile[1]	Zircon[2]	Synthetic Rutile	Titanium Slag	Pig Iron
			(Thousands of metric tonnes)		
Namakwa Sands	32	119	—	181	95
KZN Sands	22	53	—	194	112
Tronox Western Australia	24	34	211	—	—
2018 Total	78	206	211	375	207

(1) Natural rutile and leucoxene

(2) Includes all commercial grades of zircon

Our South African and Australian mineral sands resource development strategy is guided by an in-house resource development group comprised of key personnel with complementary expertise and experience. Our primary goal is to assure a long-term supply of titanium feedstocks to our vertically-integrated TiO_2 value chain.

We believe our combined integrated titanium mining-to-titanium dioxide operations constitute the largest fully-integrated TiO_2 value chain in the world, and the TiO_2 business of Tronox is the world s only mining-mineral processing chain with production of both titanium slag and synthetic rutile. Our captive slag from South Africa, synthetic rutile from Western Australia, and natural rutile from our three operations satisfy over 100% of our TiO_2 feedstock requirements. Excess TiO_2 feedstock can be marketed externally or stockpiled for future internal consumption.

Natural rutile, synthetic rutile, and titanium slag are to a certain extent fungible as titanium feedstocks for chloride pigment production. However, each titanium mineral and beneficiated mineral product has a discreet commercial market, and the commercial value of titanium feedstock is a function not only of TiO_2 content and supply and demand balances, but also particle size, trace element geochemistry, logistics and other factors. The global TiO_2 industry is a valued-added supply chain, with final product prices for TiO_2 pigment, typically more than 10 times 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 our sales contracts, pricing assumptions in our integrated TiO_2 value chain, and market intelligence.

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 the ultimate ore boundaries. To satisfy the disclosure rules in Industry Guide 7, our nominal cut-off grades are: 0.2% zircon at Namakwa Sands; 1.5% ilmenite at KZN Sands; and 1.3% THM (approximately 1% VHM) at Tronox Northern Operations, Western Australia.

Heavy Mineral Reserves

Ore reserves are those portions of mineral deposits that are economically and legally exploitable at December 31, 2018. 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 and cost/revenue assumptions.

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The following table summarizes our heavy mineral ore reserves and their contained *in situ* THM and heavy mineral assemblages as of December 31, 2018. Increases or decreases in our reserves estimates from December 31, 2017 to December 31, 2018 are indicated as a percent of in-place THM reserves.

MINE / DEPOSIT	Reserve Category	Ore (million MT)	Average Grade (% THM)	In-Place THM (million MT)	VHM Assemblage (% of THM)			Change from 2017 + (-) %
					Ilmenite	Rutile and Leucoxene	Zircon	
Namakwa Sands Open Pit Dry Mine – Western Cape RSA								
	Proven	172	8.3	14.3	35.9	7.9	9.4	
	Probable	485	5.5	26.5	50.6	9.9	11.0	
	Total Reserves	657	6.2	40.8	44.7	9.2	10.3	(6.6)%
KZN Sands Open Pit Hydraulic Mine – KZN RSA								
	Proven	231	5.9	13.7	62.2	6.7	7.7	
	Probable	11	3.7	0.4	51.7	4.9	7.0	
	Total Reserves	242	5.8	14.1	61.9	6.6	7.7	29.8 %
South Africa	**Total Reserves**	**899**		**54.9**				**0.6 %**
Cooljarloo – Dredge Mine Western Australia								
	Proven	270	1.8	5.0	61.0	7.6	10.2	
	Probable	20	2.1	0.4	61.8	7.8	9.4	
	Total Reserves	290	1.9	5.4	61.1	7.6	10.1	(7.5)%
Cooljarloo West Planned Dredge Mine – Western Australia								
	Proven	—	—	—	—	—	—	
	Probable	130	2.0	2.6	60.5	8.3	12.2	
	Total Reserves	130	2.0	2.6	60.5	8.3	12.2	22.8 %
Dongara Planned Dry Mine – Western Australia								
	Proven	62	5.2	3.2	48.7	8.9	10.9	
	Probable	—	—	—	—	—	—	

	Total Reserves	62	5.2	3.2	48.7	8.9	10.9	0.0	%
Western Australia	**Total Reserves**	**482**		**11.2**				**0.5**	**%**
Global	**Total Reserves**	**1,381**		**66.1**				**0.6**	**%**

Abbreviations and definitions:

MT — metric tonnes (1 metric ton = 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, 2018, classified as either *Probable Reserves* or *Proven Reserves*, based on level of confidence.

THM — total heavy minerals, with densities >2.9 g/cm3 regardless of commercial value

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

Change from 2017 — Increase (decrease) in percent change of in-place THM from 2017

Key Assumptions — economic viability is determined by techno-economic modeling constructed from geological, analytical and geotechnical databases, mining parameters, metallurgical recovery assumptions, pit

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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. Nominal cut-off grades are 0.2% zircon at Namakwa Sands, 1.5% ilmenite at KZN Sands, and 1.3% THM (1% VHM) at Cooljarloo and Cooljarloo West.

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 99-100%. 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 concentrates, inclusive of HM concentration at the mine and production of mineral concentrates at the separation plant, are generally in the range of 70% to 95%. Reconciliation of actual versus 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. Our revenue assumptions are anchored by in-house and external forecasts of the prevailing sales prices for our mineral concentrates and beneficiated mineral products at the time of their anticipated sale, or consumption in our vertically-integrated TiO_2 supply chain. In our experience, historical prices for commercial mineral concentrates and titanium feedstocks are not by themselves a reliable guide to future prices.

The following table compares the heavy mineral reserves reported for the three years ending December 31, 2018, 2017 and 2016:

3-Year Reserves (Mt In-Place THM)

	Reserve Life-of-Mine	**December 31,**		
		2018	**2017**	**2016**
		(In millions of MT)		
Namakwa Sands	>25 years	40.8	43.8	46.4
KZN Sands	17 years	14.1	10.9	11.7
Total South Africa		**54.9**	**54.7**	**58.1**
Cooljarloo and Cooljarloo West		8.0	7.9	8.4
Dongara		3.2	3.2	3.2
Total Western Australia	19 years	**11.2**	**11.1**	**11.6**
Total Tronox		**66.1**	**65.8**	